HAZMAT

INSTRUCTOR'S GUIDE

HAZMAT Training Curriculum and Activity Guides

The Hazmat curriculum seeks to introduce the trainees to information that will maximize their potential for certification as Hazardous Materials Handlers. Activities are designed to address a variety of learning styles while building a strong foundation in the use of Hazmat concepts and terms. This curriculum component focuses on critical thinking, problem solving, communication skills and environmental awareness.

By the end of the program, the trainees will demonstrate the following performance indicators:

- knowledge of hazard recognition and identification.
- knowledge of hazard communication regulations.
- knowledge of the health effects from the exposure to hazardous materials.
- knowledge of the legal rights and responsibilities of employers and employees.
- knowledge of the importance of Personal Protective Equipment.
- knowledge of the importance of site safety and health plans.
- knowledge of proper material handling, storage and transportation.
- knowledge of the significance of the Superfund Program.
- knowledge of OSHA regulations for hazard waste, respiratory protection and hazard communication standards.

Note: Permission has been granted by Laborers-AGC to use "Assignment Sheets" as supplemental materials in the HAZMAT curriculum.

List of Supplies and Materials

Activity	Item	Quantity
#1	Construction paper (8.5x11)	100 sheets
#2, #3	Sentence strips	100 strips
#4	Flip charts	3 pads
#4	Colored markers (8 assorted colors)	2 packs
#4	Masking tape	2 rolls
#5	8.5 x 11 maps (laminated)	25
#6	Slide projector (slides)	25
#6	Write-on transparencies	3 boxes of 50
#7	Copies of Assignment Sheet #2	20
#8	Transparency of human body (illustration of internal organs)	20
#9	Thermometer (body)	3
#9	Scale (bathroom)	3
#9	Stop watches	3
#All	Index cards (3x5 packs)	5
#All	Writing pads (8.5 x 11.5)	25
#All	Writing pencils	2 boxes
#All	Ink pens	2 boxes

Supplies (to include)

1) Week One

a. L-AGC MSDS Video
b. 3X5 Index cards
c. Blank MSDS Forms (Req. From EPA)
d. Overhead, TV, & VCR

2) Week Two

e) Diagram 15-A
f) Second Diagram of Upper Body (Colored)
g) 1970 Work Place Rights: Refer to 29 CFR 1910.120
h) 3X5 Index Cards

3) Week Three

i) PPE (Equipment Optional)
    1) Breathing Equipment
    2) Tyvek Suits
    3) Butyl Boots, Gloves, Apron
j) HT-61-71 Forms (Site Safety & Health Plans)

4) Week Four

k) US DOT Chart 11 (Labels & Placards)
l) Colored Construction Paper
m) Scissors
n) Markers
o) Plastic Containers (Quart Size)
p) Complete MSDS Example

P.S. You can call J.J. Keller & Associates @ 1 (800) 327-6868 for the US DOT label and placard chart...

Study Tips

The following study tips will be given to trainees and stressed throughout this session: (Instructor should think of ways during the training to assess trainee utilization of these tips. Tips can be used as a supplement to Study Skills.)

1. Create study environments everywhere possible.
2. Study in several short sessions of 10-15 minutes each.
3. As you read, make an outline of important information.
4. As you read, make up possible test questions.
5. Write brief, concise notes on index cards.
6. Keep note cards with you at all times and use odd times for extra study, like bus rides, bathroom, etc.
7. Read notes aloud.
8. Personally record your notes on a 90-minute cassette tape and play it at night while you're going to sleep. (Allow tape to run out.)
9. Use memory clues or links. (Catchy phrases, word associations, etc.)
10. Make clearly defined study goals.
11. Visualize success.
12. Celebrate successes.
13. Find your best study time and use it (night-owl, early-bird, no preference).
14. Help teach someone else; it reinforces your own learning.
15. Practice oral presentations, using props with notes taped on the back to aid you during your talk. (You will reinforce the habit of making brief, concise notes and create a review session for yourself)
16. Think positively!
17. Say positive statements out loud and often!
18. Believe in yourself and in your ability to do what you set out to do!

HAZMAT Training Guide

Outline of Classes and Activities

Day 1 Orientation and Overview	[Activity Guide 1 - Orientation] [Activity Guide 2 - Overview] [Activity Guide 3 - Comprehension and Retention]
Day 2 Hazard Recognition and Identification	[Activity Guide 4 - Define Terms] [Activity Guide 5 - Define Acronyms] [Activity Guide 6 - Group Research & Oral Presentation] [Activity Guide 7 - Identifying and Recording Hazards]
Day 3 Hazard Communication Regulation	[Activity Guide 8 - Group Research and Presentation] [Activity Guide 9 - Material Safety Data Sheets] [Activity Guide 10 - Concept Map] [Activity Guide 11 - Flammables and Combustibles] [Activity Guide 12 - Hazardous Materials Laboratory]
Day 4 Field Trip #1	**[Personal Protective Equipment]**
Day 5 Review and Assessment	
Day 6 Health Effects	[Activity Guide 13 - Define Terms] [Activity Guide 14 - Define Acronyms] [Activity Guide 15 - Trace Routes of Exposure] [Activity Guide 16 - Concept Map of Chemical Exposure] [Activity Guide 17 - Affected Organs-Human Anatomy] [Activity Guide 18 - Monitoring Vital Signs]
Day 7 Legal Rights	[Activity Guide 19 - OSHA and Superfund Sites] [Activity Guide 20 - Clean-up Operation] [Activity Guide 21 - Acts]

Day 8 Personal Protective Equipment
[Activity Guide 22 - Demonstration by HAZMAT Team]
[Activity Guide 23 - Define Acronyms and Abbreviations]

Day 9 Field Trip #2 **[Constructional Occupational Hazards]**

Day 10 Review and Assessment

Day 11 Personal Protective Equipment
[Activity Guide 24 - APRs, SARs, and SCBAs]
[Activity Guide 25 - Trainee Review and Assessment]

Day 12 Site Safety and Health Plans
[Activity Guide 26 - Develop Site Safety Plan]
[Activity Guide 27 - Define Acronyms and Abbreviations]
[Activity Guide 28 - Develop Emergency Response Plan]

Day 13 Material Handling, Storage and Transportation
[Activity Guide 29 - Video on Asbestos]

Day 14 Field Trip #3 **[Chemical Hazards]**

Day 15 Review and Assessment

Day 16 PPE Monitoring [Activity Guide 30 - Coast Guard Demonstration]

Day 17 Superfund Program and Community Relations
[Activity Guide 31 - Define Terms]

Day 18 Cumulative Review [Activity Guide 32 - Terms]

Day 19 Field Tip #4 **[Brownfields]**

Day 20 Review and Assessment

Day 21 Cumulative Review [Activity Guide 33 - OSHA Regulations]

Day 22 Cumulative Review [Activity Guide 34 - Compliance]

Day 23 OSHA [Activity Guide 35 - Levels of Protection]

Day 24 Field Trip #5 **[Compliance]**
[Need for Minority Workers]

Day 25 Review and Assessment

Day 26 Final Portfolio

Day 27 Program End

Day 1

Orientation and Overview
Activity 1 – 3

Instructional Overview

Activity #1.	Introductions of staff and participants. Assignment of trainee groups (Ex. 3 groups of 5 persons).
Activity #2.	Explanation of Portfolio Assessment. Remind trainees to include all assignments in the training binder, which will serve as their working portfolio. Discussion of study tips for maximum comprehension and retention of training information. A Hazardous Waste Pretest is included in this component. Instructors may opt to use the Study Skills Pretest to establish trainees' knowledge of the topic.
Activity # 3.	Distribution of materials and supplies.

DAY 1
Activity Guide #1
Orientation

Introductions of staff and participants. Assignment of trainee groups, 3 groups of 5 persons.

Performance Indicator

After completion of Orientation, the trainees:

1) Will have been introduced to the instructors/tutors
2) Will have been introduced to other trainees
3) Will have group assignments

Grouping: Whole group

Tasks:

1) Introduction of each instructor and tutor, including a short biography and statement of support for program
2) Introduction of each trainee with their statement of what they hope to gain from this program (expectations)
3) Division of the trainees into small groups (3 groups of 5 each)

Instructional Materials and Supplies:

Curriculum Guide
Five strips of blue construction paper
Five strips of brown construction paper
Five strips of white construction paper
Paper and pencils

Instructor's Notes

To facilitate group formation, place five strips of each color of paper in a bag. Have the trainees pull strips from the bag without looking. Like colors belong to the same group during their training. The teacher will have to assess the group members; sometimes group dynamics are better if members determine the grouping for themselves. Note what grouping occurs as the trainees enter the first day.

DAY 1

Activity Guide #2

Overview

Explanation of Portfolio Assessment

Remind the trainees to include all assignments in the training binder, which will serve as their working portfolio.

Performance Indicator

After completion of the Overview, the trainee will have:

1) Knowledge of projected training schedule
2) Introduction to program requirements and expectations of the trainee's as well as those providing the support and training.
3) Understanding of Portfolio requirements

Grouping: Whole group

Tasks:

1) Determine prior knowledge base
2) Performance indicators
3) Distribution of supplies and materials
4) Introduction of Portfolio assessment
5) Remind trainees to include all assignments in the training binders (working portfolio).

Instructional Materials and Supplies:

Curriculum Guide
Daily class schedules
Paper, pencils, notebooks

Instructor's Notes

Provide an overview using the training schedule, performance objectives and Curriculum Guide, to insure trainee understanding of the program and the daily routine expected. Explain the Portfolio requirements.

Portfolio Assessment

WHAT?

Documentation of trainee thinking, growth over time, views of themselves, problem solving ability and process.

WHY?

Alternative assessment, useful feedback to students and teacher, and a tool to evaluate progress for the trainees and program.

HOW?

1) Working/developmental: Collection of all learner work - products in progress as well as final, notes, revisions, video tapes, pictures, ratings, etc., can be accumulated in a binder, pocket folder, shoe box, etc.

2) Presentation: Trainee's selected samples and examples of their best work, including minimum evidences that the student needs to demonstrate achievement and interest of targeted audience. This includes the trainee's statement of reason(s) for ***each*** selection.

DAY 1

Activity Guide #3

Comprehension/Retention

Discuss study tips for maximum comprehension and retention of training information.

Note: A Hazardous Waste Pretest is included in this component. Instructors may opt to use the Study Skills Pretest to establish trainee's knowledge of the topic.

Performance Indicator

After completion of this activity, the trainee will have knowledge of strategies to enhance comprehension and retention of training material and information.

Grouping: Whole group

Tasks:

1) Understand the suggestions for enhanced comprehension of the HAZMAT information.
2) Personalize the tips to improve ability to remember information.

Instructional Materials and Supplies:

Curriculum Guide
Study skills
Paper, pencils, notebooks

Instructor's Notes

Present an overview of the 18 specific recommendations for improving Study Skills, listed in the curriculum guide HT-4. Trainees, individually, should be asked to express their understanding of the techniques being discussed. They should also talk about techniques they have used in the past and see if their method correlates to any of the 18 being discussed.

Day 2

Hazard Recognition & Identification

Instructional Overview

Review previous day's instruction and activities, and homework (first ten minutes of class).

Activity #4	Define terms and write definitions on cards of one color and terms on cards of another color.
Activity #5:	Define acronyms. Class creates mnemonics to aid memory.
Activity #6:	Group research on assigned topics and oral presentations on findings:
Activity #7:	(Whole group) From a series of photos of a simulated hazardous site, identify and record ten hazards. A discussion will follow.

Homework Assignment: Create a summary outline from today's session notes and bring to class an empty container, like an oatmeal or cereal box.

DAY 2

Activity Guide #4

Hazard Recognition & Identification

Define the terms below and write definitions on cards of one color and terms on cards of another color.

Flammable	**Flash Point**
Combustibles	**Flammable Range**
Corrosives	**Oxidizers**
Acute Effects	**Chronic Effects**
Biological Waste	**Chemical Reactivity**
Air Reactive Materials	**Water Reactive Materials**
Alpha Particles	**Beta Particles**
Gamma Rays	

Note: Instructors may supplement with Assignment Sheet One.

Performance Indicator

After completion of this activity, trainees will have knowledge of the terms and acronyms associated with hazard recognition and identification.

Grouping:

Three groups of trainees.

Tasks:

Match definitions and acronyms with corresponding terms.

Instructional Materials and Supplies:

Curriculum Guide
Index cards (3”x 5”), with terms and definitions
Paper, pencils, notebooks

Instructor’s Notes

Trainees should match the color-coded card containing one of the terms with one containing the definition, within a specified time limit. Options: post definitions on the wall and have trainees post the correct term next to the corresponding definition. Could also be played like Concentration or Old Maid by putting color coded terms & definitions face down, randomly, on a table, then each group competes on a timed basis; trainees take turns picking up cards and trying to match acronyms, first group to complete task correctly wins.

Assignment Sheet #1

Use with Activity #4

Match the following words with the proper definition or example:

_____ Acute Effects	a.	Temperature at which a liquid vaporizes enough to ignite.
_____ Chronic Effects	b.	Materials that pose fire hazards.
_____ Flammables	c.	Strong acids and bases.
_____ Flash Point	d.	Materials that breakdown and form O_2
_____ Combustibles	e.	Materials that are incompatible with air.
_____ Flammable Range	f.	Slow, gradual onset of symptoms.
_____ Corrosives	g.	When two chemicals react to produce a change.
_____ Oxidizers	h.	Materials that have a low flash point.
_____ Biological Waste	i.	Harmful if swallowed or inhaled.
_____ Chemical Reaction	j.	Normally short term.
_____ Air Reactive	k.	Red-bagged viruses and bacteria.
_____ Water Reactive	l.	Concentrations between the LFL and UFL.
_____ Alpha Particles	m.	Can be protected from by use of PPE.
_____ Beta Particles	n.	Requires a lead protective shield.
_____ Gamma Rays	o.	Sodium and potassium.

DAY 2

Activity Guide #5

Hazard Recognition & Identification

Define these acronyms: IDLH, LFL, UFL, UEL and LEL. Create a rhyme or catchy saying to remember them.

Performance Indicator

After completion of this activity, the trainees will have an understanding of some important acronyms associated with hazard recognition and identification.

Grouping: Three groups of trainees.

Tasks: Trainees develop a rap, rhyme or catchy saying to remember these acronyms.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Sentence strips
Masking tape

Instructor's Notes

This is cooperative group work. Teacher should act as coach for this activity, giving examples as needed; refer to Study Skills section of Instructor's Guide. Groups develop the rhyme, etc. and write it on the sentence strips for display. Groups are free to develop more than one rhyme or phrase.

DAY 2

Activity Guide #6

Hazard Recognition & Identification

Group Research from available resources on assigned topics and oral presentations on findings:

Group 1-Hazard Categories
Group 2- Hazard Recognition
Group 3- Accident Prevention

(Each group will use Flip charts and color markers; research the topic, summarize findings and present summary on flip chart, allowing the other groups to take notes.)

Performance Indicator

After completion of this activity, trainees will have an understanding of three important topics associated with hazard recognition and identification: Hazard Categories, Hazard Recognition and Accident Prevention.

Grouping: Three groups of trainees.

Tasks: Trainees research information and make oral presentations.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Color markers
Flip charts

Instructor's Notes

This is cooperative group work. Each group selects a leader and a presenter. The other groups take notes on each presentation for entry in their trainee manuals.

DAY 2

Activity Guide #7

Hazard Recognition & Identification

From a series of photos of a simulated hazardous site, the whole group identifies and records ten hazards. A discussion will follow.

Performance Indicator

After completion of this activity, trainees will have an understanding of hazard recognition and identification through the use of simulated photos.

Grouping: Three groups trainees.

Tasks: Trainees will visually identify hazards and discuss findings.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Series of photos of simulated hazardous site(s)

Instructor's Notes

This is cooperative group work. This activity could be done later in the training, after a field trip to a Superfund site, where trainees should have an opportunity to take pictures. Instructors should be familiar with visual cues for hazard recognition or secure a visit from a person with HAZMAT certification.

Day 3

Hazard Communications Regulations

Instructional Overview

Review previous day and homework (first ten minutes of class).

Activity #8:	Group Research & "Slide" presentation. Illustrates differences between employee and employer hazard communication regulations.
Activity #9:	MSDS - Material Safety Data Sheet Identify and discuss an MSDS sheet.
Activity #10:	Create Concept Map for hazards
Activity #11	(Optional) Presentation from Fire or Police Department HAZMAT Unit.
Activity #12:	Discussion Oral discussion following presentation on flammables & combustibles.
Activity #13:	Research Hazardous Material Labeling. Trainee creates a replica of an authentic HAZMAT label.

Homework Assignment: Create a Summary Outline from today's session notes.

DAY 3

Activity Guide #8

Hazard Communication Regulations

Group Research & "Slide" Presentation: Compare and contrast employee versus employer hazard communication regulations.

Performance Indicator

After completion of this activity, trainees will demonstrate an understanding of hazard communication regulations as it relates to the employee versus the employer in an oral presentation.

Grouping: Three groups of trainees.

Tasks: 1) Trainees conduct group research and present findings through a slide presentation using overhead transparencies.

2) Trainees compare and contrast employee versus employer hazard communication regulations.

Use graphics and colors while using transparencies for the "slides."

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Transparencies
Color transparency markers
Overhead projector
Screen

Instructor's Notes

This is cooperative group work. The trainees should research well and present their findings orally, utilizing the transparencies, color, graphics or cartoons. Encourage creativity.

DAY 3

Activity Guide #9

Hazard Communication Regulations

Using a MSDS (Material Safety Data Sheet), each group will identify and discuss orally, each designated section. Each group will take notes on the other group presentations.

Performance Indicator

After completion of this activity, the trainees will have an understanding of the use of the Material Safety Data Sheet in hazard communication regulations.

Grouping: Group work

Tasks: Trainees fill out and discuss a MSDS.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
20 filled-in MSDS sheets as examples
1 transparency of MSDS

Instructor's Notes

This is group work. Hand out sample MSDS sheets and discuss them. Let each group discuss and fill out a designated section of the transparency copy. Let the trainees try filling out a blank form, discuss important features and say why they are important.

Assignment Sheet #2

Use with Activity #9

MATERIAL SAFETY DATA SHEETS (MSDSs)

An MSDS has the following eight basic parts, which will be explained in more detail in the following pages.

Section 1	Identity and Manufacturer's
Section 2	Hazardous Ingredients
Section 3	Physical/ Chemical Characteristics
Section 4	Fire and Explosion Hazard Data
Section 5	Reactivity Data
Section 6	Health Hazard Data
Section 7	Precautions for Safe Handling and Use
Section 8	Control Measure

MSDS SECTION 1

IDENTITY (as used on label and list) ABC Solvent	NOTE: Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked.

SECTION 1 Manufacturer's Information

Manufacturer's Name	Emergency Telephone Number
ABC Company Inc.	1-800-111-2222
Address	Telephone Number for Information
Canary Street	1-999-333-4445
Somewhere, USA 12345	Data Prepared
	May 1, 1989
	Signature of Preparer (optional)

This section identifies the chemical (as on label), the name and address of the manufacturer, phone numbers for use in emergencies or to get more information, and the date on which the MSDS was prepared. (Note: The date is particularly important in making sure the information contained in the MSDS is fully up-to-date as required by law.)

MSDS SECTION 2

Section 2 Hazardous Ingredients/Identity Information
Hazardous Components (Specific)

Chemical Identity Common Name	OSHA PEL (STEL)	ACGIH	NIOSH	%
Acetone (2- Propanone)	750 ppm (1000ppm)	750 ppm	250ppm	20.0
Ethylene Glycol	50ppm (ceiling)	50 ppm	Ceiling	3.0
Methy Ethyl Ketone (2-Butanone, MEK)	200 ppm (300 ppm)	200 ppm	Same	2.5
Xylene	100ppm (150 ppm)	100 ppm	Same	5.8
(Insert Ingredients- non hazardous)				68.7

Section two of a MSDS identifies the hazardous ingredients and properties of the chemical. This includes the identity as well as the common name and trade name of the chemical, OSHA Permissible Exposure Limits (PELs), established Threshold Limit Values (TLVs), and any other recommended limits.

Assignment Sheet #3

Use with Activity #9

MATERIAL SAFETY DATA SHEETS (MSDSs)

Demonstrate how to use MSDSs by completing Assignment Sheet #3 using the sample MSDS given in Figure 1.

a. What is the name of the product? _____

b. List the hazardous components of this product: _____
_____
_____

c. Is this product lighter than air? Yes No

d. Is this product a solid? Yes No

e. What is the flash point of this product? _____

f. Is this product flammable or combustible? _____

g. Will this product explode? Yes No

h. Does this product contain cancer-causing components? Yes No

i. What are the routes of exposure? _____
_____

j. Is respiratory protection required while using this product?
Yes No

k. What respirator should be used when using this product?
_____
_____
_____

l. What other personal protective equipment is to be used with this product?
_____
_____
_____

Assignment Sheet #4

Use with Activity #9

MATERIAL SAFETY DATA SHEETS (MSDSs)

Demonstrate how to use MSDs by completing Assignment Sheet #4 using the sample MSDs given in Figure 1.

m. What conditions are to be avoided when using this product?

_____
_____
_____

n. When was this MSDS completed? _____

o. What is the emergency phone number for this product?

_____

p. Is emergency and first aid information given? Yes No

q. List the information that must be given on a typical label:

_____
_____
_____

r. List the three basic types of labeling systems:

_____
_____
_____

DAY 3

Activity Guide #10

Hazard Communication Regulations

Create a Concept Map for chemical and physical hazards.

Performance Indicator

After completion of this activity, trainees will demonstrate an understanding of chemical and physical hazards as they relate to hazard communication regulations by completing a concept map.

Grouping: Three groups of 5 trainees each.

Tasks: Trainees develop concept maps for hazards, both chemical and physical.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Chalkboard
Chalk

Instructor's Notes

This is cooperative group work. Review the handout explaining Concept Maps, then facilitate map construction by the trainees.

DAY 3

Activity Guide #11

Hazard Communication Regulations

(OPTIONAL)

Trainees view a video and/or live presentation from Fire or Police Department HAZMAT Unit.

Performance Indicator

After completion of this activity, trainees will have an appreciation of the work of professional HAZMAT emergency response personnel and their activities.

Grouping: Whole group

Tasks: After the presentation, encourage the trainees to engage the professionals in dialogue and discussion.

Instructional Materials and Supplies:

Video, VCR, TV monitor, other audiovisual equipment as needed.

Instructor's Notes

Try to set up a presentation, live or video, from the Fire or Police Department HAZMAT Unit. This will provide a first-hand experience for trainees.

How to Make a Concept Map

1. Make a list of the main ideas or concepts: It might help to write concepts on pieces of paper. These pieces of paper can be arranged and rearranged several times until you determine how the concepts are connected.

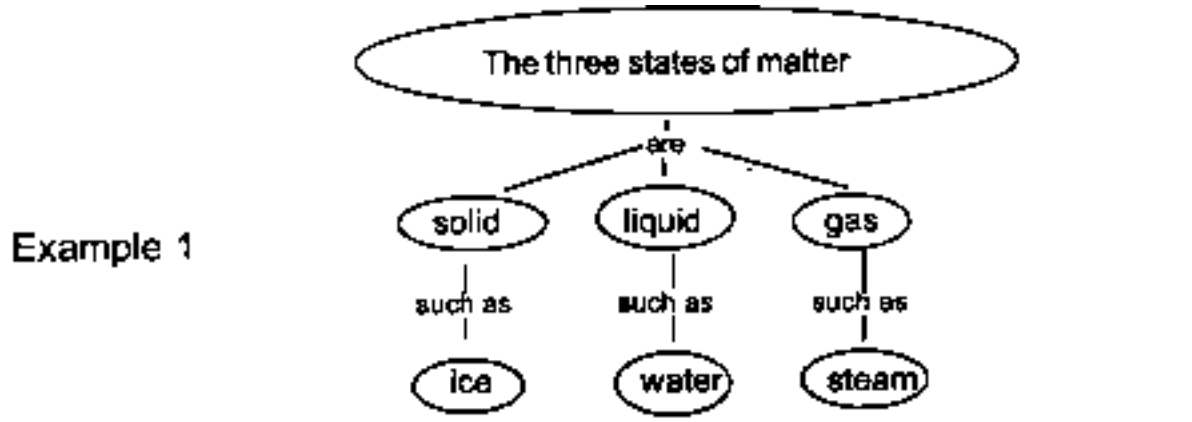
2. Begin putting the concepts in order. Put the main or the more general concept at the top then place the more specific concepts next. Always ask "how are these concepts related to the main one?"

3. Connect related concepts with lines.

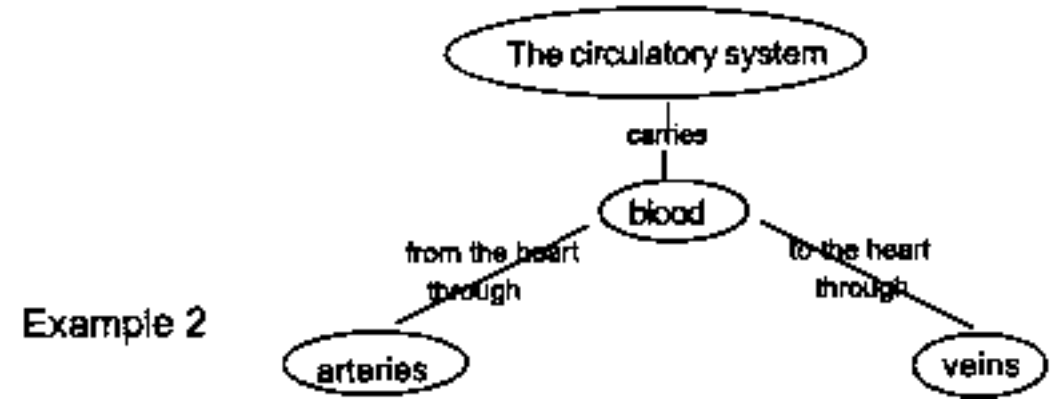
4. Write an action or connecting word or phrase that tells how the concepts are related.

A Concept Map shows visually, how ideas and concepts are related to each other. To see how concepts are linked together, helps you understand better.

Example 1



Example 2



DAY 3

Activity Guide #12

Hazard Communication Regulations

Conduct an oral discussion following an audiovisual and/or live presentation comparing and contrasting flammables & combustibles.

Use Activity Sheet #9

Performance Indicator

After completion of this activity, the trainees will have an understanding of flammables & combustibles, as they relate to hazard communication regulations.

Grouping: Three groups of 5 trainees each.

Tasks: Actively engage the trainees in discussions that compare and contrast flammables and combustibles.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Chalkboard
Chalk

Instructor's Notes

This is cooperative group work. If a live presentation cannot be arranged (previous activity), then use a video from the Fire or Police Department HAZMAT Unit. This will provide a first-hand experience for the trainees. The trainees should be able to give examples of things that are combustible or flammable. If the demonstration is not available, have trainees research the information and use a chart to display the discussion.

Assignment Sheet #5

Use with Activity #12

a. What is the name of the Product?

_____
_____

b. Who makes it?

_____
_____

c. What is the physical hazard from this product?

_____
_____

d. What are the health hazards?

_____
_____

e. What are the target organs?

_____
_____

f. What are the safe handling recommendations?

_____
_____
_____

g. What measures are to be used to limit worker exposure?

_____
_____
_____

h. What is the first aid information given?

_____
_____
_____

DAY 3

Activity Guide #13

Hazard Communication Regulations

Researching Hazardous Material Labeling. Have the trainees bring to class an empty container and create a replica of an authentic label based on his/her research.

Performance Indicator

After completion of this activity, the trainees will demonstrate an understanding of Hazardous Material Labeling, as it relates to hazard communication regulations, by creating their own labels.

Grouping: Individual

Tasks: Trainees bring to class an empty container and create a replica of an authentic label after his/her research of correct labeling procedures for Hazardous Materials.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Color pencils or markers
Chalkboard
Chalk
Glue stick
Empty container (i.e., oatmeal box, cereal box, etc.)

Instructor's Notes

This is cooperative group work. Allow trainees time to research correct labeling procedures for hazardous materials. Discuss findings among all groups. Trainees then create a correct label for their container.

Day 4

Field Trip No. 1

Fire Fighter Training School

Introduction to PPE and HAZMAT protective terms, flash point, combustible, corrosive, flammable range, etc.

Day 5

Review and Assessment

1. Review trainee's understanding of program and relationship to Environmental Justice.

2. Discuss newspaper articles that relate to this training.

3. Discuss career paths related to this training.

Day 5

Environmentally Relevant Discussion Material

Day 6

Health Effects

Instructional Overview

Review previous day's activities and homework (first ten minutes of class).

Reference: Manual, Section 3

Activity #13: Definition and illustration of vocabulary.

Activity #14: Definition of acronyms.

Activity #15: Trace routes of exposure.

Activity #16: Create a Concept Map for chemical exposure.

Activity #17: Locate the target organs in human anatomy for chemical exposure.

Activity #18: Monitor a partner's pulse and temperature. Calculate and graph the averages.

Homework Assignment: Create a summary outline on index cards from today's session notes.

DAY 6

Activity Guide #13

Health Effects

Trainees define and illustrate the following terms using pictures, cartoons, drawings, magazine pictures, etc.

Cancer, Local Effect, Systemic Effect, Dose, Dusts, Fumes, Gases, Ergonomic, Ingestion, Inhalation, Latency Period, Mists, Target Organs, Vapors, Biohazard, Absorption.

Performance Indicator

After completion of this activity, trainees will have an understanding of several terms that relate to health effects of hazardous materials.

Grouping: Three groups of 5 trainees each.

Tasks: Trainees develop ways to remember these terms by using cartoons, drawings or other types of illustrations.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Color pencils

Instructor's Notes

This is cooperative group work. Trainees should approach this activity as if they were explaining some of these Hazmat terms to some elementary school students. The cartoons or graphics can enhance the student's understanding and ability to remember.

DAY 6

Activity Guide #14

Health Effects

Define the following acronyms:

PPE, OSHA, PEL, TWA, NIOSH, TLV.

Performance Indicator

After completion of this activity, the trainees will have an understanding of several acronyms that relate to health effects of hazardous materials.

Grouping: Three groups of 5 trainees each.

Tasks: Trainees research these acronyms and the groups compete for points and treats (candy or gum).

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Flash cards
Candy or some other treats

Instructor's Notes

This is cooperative group work. After definitions are found and the groups take a little time to study them, the groups compete for points and treats, to encourage the discovery of ways to best remember the terms.

DAY 6

Activity Guide #15

Health Effects

Utilizing the supplied diagram, (15-A), trace the three routes of exposure. Assign a different color to each.

Performance Indicator

After completion of this activity, the trainees will have an understanding of the routes of exposure in the human body as relates to hazardous materials.

Grouping: Individual

Tasks: Trainees will use a diagram of the upper human body and color pencils, to trace the three routes of exposure, as it relates to the handling or exposure to Hazardous Materials.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Diagram of the upper human body, showing the respiratory system
Color pencils or markers

Instructor's Notes

This is an individual project. The trainees may research as a group but each person must use this diagram as a portfolio entry.

Assignment Sheet #6

Use with Activities #15 & #17

Routes of Exposure

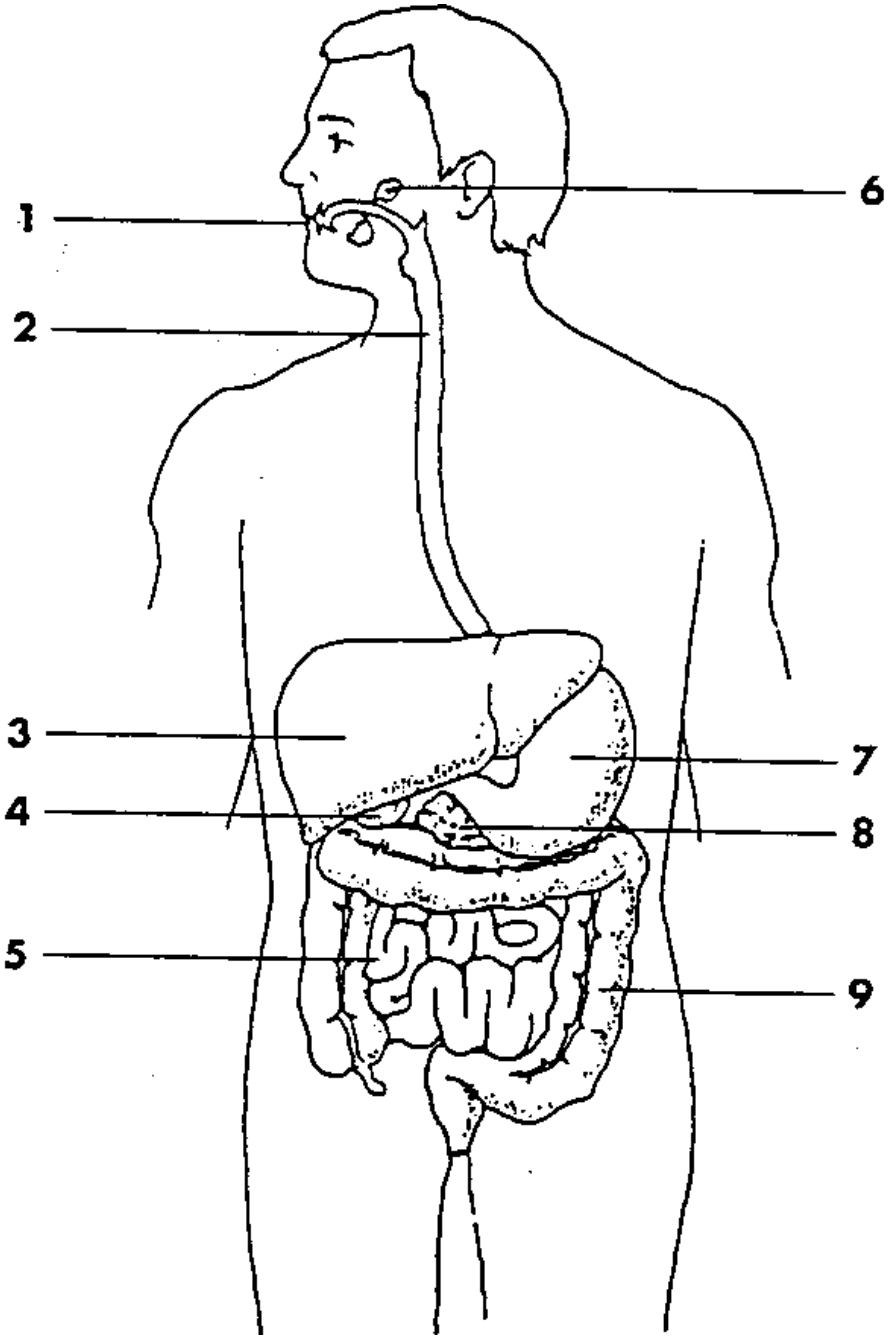


Diagram 15-A

DAY 6

Activity Guide #16

Health Effects

Create a Concept Map for chemical exposure including examples and indicators.

Example: See (16-A)

Performance Indicator

After completion of this activity, the trainees will have knowledge of chemical exposure and the ability to cite examples and indicators.

Grouping: Individual

Tasks: Trainees develop concept maps for chemical exposure, including examples and indicators of the exposure.

Instructional Materials and Supplies:

Curriculum Guide

Paper, pencils, notebooks

Instructor's Notes

This is cooperative group work for the research component only. Each trainee should be encouraged to have his/her own Concept Map. Review the handout explaining Concept Maps, then facilitate map construction.

DAY 6

Activity Guide #17

Health Effects

Using a human anatomy model or diagram (15-A) locate the target organs for chemical exposure.

Performance Indicator

After completion of this activity, the trainees will have knowledge of the organs of the human body that are affected by chemical exposure to Hazardous materials.

Grouping: Individual

Tasks: Trainees use a human anatomy model or diagram to locate and point out the target organs of chemical exposure.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Color pencils
Human anatomy model or diagram showing internal organs

Instructor's Notes

This is cooperative group work for the research component only. Trainees are responsible for their own diagram. This could be a portfolio entry.

DAY 6

Activity Guide #18

Health Effects

Choose a partner, monitor and record their pulse, temperature, and weight for one hour, in fifteen minute intervals. Calculate an average.

Performance Indicator

After completion of this activity, the trainees will understand the importance of knowing what is normal for their own bodies. The knowledge will assist with knowing if something is wrong, especially when working with hazardous materials.

Grouping: Pairs

Tasks: Each trainee has a partner. Instruct them to monitor and record their partner's pulse, temperature, and weight. Three readings will be taken, every 2 minutes and the average calculated. Trainees should take pulse and temperature readings after sitting for a while, standing for a while and after light exercise. They calculate the average for each and graph the results. If time permits, discuss any differences.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks, graph paper
Chalkboard
Chalk
Thermometer
Scale

Instructor's Notes

This is cooperative group work, with trainees working in pairs. Demonstrate correct technique for taking pulse, temperature and weight using one or two trainees. Allow trainees to practice before they actually begin recording data. Practice seeking a resting heart rate and a heart rate after some exercise has occurred.

Day 7

Legal Rights

Instructional Overview

Review previous day's instruction and homework (first ten minutes of class).

Reference: Manual - Section 4

Activity #19:	Panel discussion justifying the OSHA rights and responsibilities of employers versus employees.
Activity #20:	Research a "clean-up" operation and write about it.
Activity #21:	Match a description of environmental acts.

Homework Assignment:	Investigate the meaning and use of PPE. Prepare a summary of your findings.

DAY 7

Activity Guide #19

Legal Rights

Panel discussion justifying the rights and responsibilities of employers versus employees, according to the OSHA Act of 1970. (See web site: www.OSHA.gov for complete information.)

Performance Indicator

After completion of this activity, the trainees will have an understanding of the legal rights of employees and employers according to the OSHA Act of 1970.

Grouping: Two groups.

Tasks: Trainees will debate the issues of employee rights and responsibilities versus employers rights and responsibilities, according to OSHA Act of 1970. Two groups are needed, one representing employees and one representing employers.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Chalkboard
Chalk
Copies of 1970 Employee Workplace Rights

Instructor's Notes

This is cooperative group work. Insure that this activity includes the 14 rights and responsibilities of employees and the 8 things that employees need to do if they are being harassed for exercising their rights. Divide trainees into two groups, one for each position.

1970 Employee Workplace Rights

1. Review copies of appropriate standards, rules, regulations, and requirements the employer should have available at the workplace.

2. Request information from the employer on safety and health hazards in the workplace, precautions that may be taken and procedures to be followed if an employee is involved in an accident or is exposed to toxic substances.

3. Have access to relevant employee exposure and medical records.

4. Request OSHA to conduct an inspection if they believe hazardous conditions or violations of standards exist in the workplace.

5. Have an authorized employee representative accompany the OSHA compliance officer during the inspection tour.

6. Respond to questions from the OSHA compliance officer, particularly if there is not an authorized employee representative accompanying the compliance officer on the inspection walk-around.

7. Observe any monitoring or measuring of hazardous materials and see the resulting records, as specified under the Act, and as required by OSHA standards.

8. Have an authorized representative, or themselves, review the Log and Summary of Occupational Injuries (OSHA No. 200) at a reasonable time and in a reasonable manner.

9. Object to the abatement period set by OSHA for correcting any violation in the citation issued to the employer by writing to the OSHA area director within 15 working days from the date the employer receives the citation.

10. Submit a written request to the National Institute for Occupational Safety and Health (NIOSH) for information on whether any substance in the workplace has potentially toxic effects in the concentration being used, and have names withheld from the employer, if that is requested.

1970 Employee Workplace Rights (cont'd.)

11. Be notified by the employer if the employer applies for a variance from OSHA standards, and testify at a variance hearing, and appeal the final decision.

12. Have names withheld from employer, upon request to OSHA, if written and signed complaint is filed.

13. Be advised of OSHA actions regarding a complaint and request an informal review of any decision not to inspect or to issue a citation.

14. File a Section 11 discrimination complaint if punished for exercising the above rights, or for refusing to work when faced with danger of death or serious injury and there is sufficient time for OSHA to inspect, or filing a Section 405 reprisal complaint {under the Surface Transportation Assistance (STTA)}.

Assignment Sheet #7

Use with Activity #19

Legal Rights of Employees

1. List the fourteen (14) rights and responsibilities given to the employee by the Occupational Safety and Health Act of 1970.

2. List the seven (7) responsibilities of the employee under the Occupational Safety and Health Act of 1970.

3. List the eight (8) items you must do if you believe you have been punished for exercising one of your OSHA rights.

DAY 7

Activity Guide #20

Legal Rights

Research the meaning of "clean-up operation." Write a letter to a young relative explaining this process.

Performance Indicator

After completion of this activity, trainees will have an understanding of "clean-up operation."

Grouping: Individual

Tasks: Trainees will research the meaning of "clean-up operation," then discuss their findings. The trainees should write a letter to a young relative explaining this process.

Instructional Materials and Supplies: Curriculum Guide
Paper, pencils, notebooks

Instructor's Notes

This is cooperative group work for the research component only. Actual letters are individual responsibilities. Consider the young relative to be a 5th or 6th grader. This is an assessment tool to see if the trainees can explain "clean-up operation." They may read their individual letters to the class. Encourage creativity.

DAY 7

Activity Guide #21

Legal Rights

Match a description of each act below, to its corresponding term.

Clean Air Act, Clean Water Act, Toxic Substance Control Act, Community Right-to-Know, Resource Conservation and Recovery Act, CERCLA, Safe Drinking Water Act, Hazardous Materials Transportation, Superfund Amendments and Reauthorization Act (SARA).

Performance Indicator

After completion of this activity, trainees will have an understanding of some of the major Environmental Acts.

Grouping: Grouping will be in pairs

Tasks: Trainees will research the above acts and corresponding descriptions will be placed on strips of paper and put in a small envelope; trainees will match the strips correctly in team competition).

(Alternative: Trainees will research the meaning of these Acts, then participate in a mock Congressional hearing. This hearing is being held because Congress has decided to eliminate all but three major acts. Trainees must defend three acts they feel should be kept.)

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Strips of paper for descriptions of Acts

Instructor's Notes

This is cooperative group work. Encourage participation of all group members. Hearing could be held in a small auditorium or set up in the classroom. Trainees should be able to defend their selections. (For information on employees' medical rights, check web site, www.OSHA.gov).

Day 8

Personal Protective Equipment

Instructional Overview

Review previous day's activities and homework (first ten minutes of class).

Reference: Manual - Section 5

Activity #22: Demonstrations and modeling of PPE by a HAZMAT Team.

Activity #23: Utilizing a "pass & build" activity, trainees study listed and additional related definitions.

Assignment Sheet #8
Use with Activity #21
Environmental Protection Laws

Match the following environmental protection laws with the correct definition.

1. _____ Clean Air Act

2. _____ Toxic Substances Control Act

3. _____ Clean Water Act

4. _____ Superfund Amendments and Reauthorization Act (SARA)

5. _____ Community Right-to-know

6. _____ CERCLA

7. _____ Resources Conservation and Recovery Act

8. _____ Hazardous Materials Transportation

9. _____ Safe Drinking Water Act

a. Environmental law controlling the introduction of pollutants into the nations water.

b. This federal legislation involves emergency planning, reporting, and notification requirements intended to protect the public in the event of a release of a hazardous substance.

c. This law regulates the nations drinking water.

d. This legislation regulates air emissions released into the environment from industry, consumer products, and auto-mobiles

e. This Act is commonly known as Superfund, and was designed to identify and clean-up those sites that pose a serious threat to human health.

f. This act regulates the transportation of hazardous materials.

g. “Cradle to grave” legislation.

h. This Act requires that specific chemicals be tested and regulated to determine their health and environmental impact.

i. Expanded CERCLA to include worker protection requirements.

DAY 8

Activity Guide #22

Personal Protective Equipment

Demonstrations and modeling of PPE by a HAZMAT Team.
Based on the demonstration, determine the meaning of the following terms:

Protection Factor	Maximum Use Level
Penetration	Permeation
Quantitative Fit Test	Qualitative Fit Test
Tested and Certified	Degradation

(During or after the demonstration, ask questions to get an understanding of the above terms as they relate to PPE.)

Performance Indicator

After completion of this activity, trainees will have an understanding of personal protective equipment, known as PPE.

Grouping: Whole group

Tasks:

Trainees will observe a demonstration and modeling of authentic personal protective equipment demonstrated by the HAZMAT Team of the Fire or Police department.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Camera or video equipment

Instructor's Notes

A trainee begins by reciting an acronym and definition and the next trainee has to recite the definition just given and give another in the above list. Keep going around the circle in this manner. Option: If a trainee misses, he is eliminated from the activity, and the game continues until there is only one winner! The trainee who remembers the most acronyms wins. Each trainee is responsible for remembering his acronym plus the ones before his.

Assignment Sheet #9

Use with Activity #22

Personal Protective Equipment

Define the following terms:

Protection Factor _____
_____
_____

Maximum Use Level _____
_____
_____

Tested and Certified _____
_____
_____

Degradation _____
_____
_____

Permeation _____
_____
_____

Penetration _____
_____
_____

Quantitative Fit Test _____
_____
_____

Qualitative Fit Test _____
_____
_____

DAY 8

Activity Guide #23

Personal Protective Equipment

Utilizing a "pass & build" activity, the trainees study the definitions of the listed acronyms/abbreviations. Define the following acronyms or abbreviations to prepare for this activity

APR	OSHA	SCBA	TC	PSI	ppb
PAPR	ACGIH	PEL	CPC	HEPA	ppm
SAR	NIOSH	TLV	PPE	MUL	TWA
		FF	IDLH		

Performance Indicator

After completion of this activity, the trainees will have knowledge of some key acronyms and/or abbreviations.

Grouping: Whole group

Tasks: In a "pass and build" activity, each trainee is given an acronym. Form a circle. One trainee reads his acronym with the appropriate definition. The next trainee must repeat the first acronym plus his own without using notes. The next trainee repeats his plus the previous two. If someone misses, the group can give him clues, but if he still misses, then he is eliminated. This continues until only one trainee is left; the winner!

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Camera or video equipment

Instructor's Notes

Confirm the Hazmat presentation prior to this session. This is a demonstration activity. Videotape this activity for future reference. Treats during the game, for correct answers, would be fun.

Assignment Sheet #10

Use with Activity #23

Write out the following abbreviations:

ACGIH _____

APR _____

CPC _____

FF _____

HEPA _____

IDLH _____

MUL _____

NIOSH _____

OSHA _____

PAPR _____

PEL _____

ppb _____

PPE _____

ppm _____

PSI _____

SAR _____

SCBA _____

TC _____

TLV _____

TWA _____

Day 9

Field Trip No. 2

Schedule a field trip to a shipyard or an industrial site where the trainees can see construction equipment and discuss occupational hazards and safety.

Day 10

Review and Assessment

1. Review and Assessment - Have the trainees take turns giving one-sentence statements of what they have learned thus far. Statements are placed on the flipcharts and will serve as a review process.

2. Assessment Test - Instructor made

Day 11

Personal Protective Equipment PPE

Instructional Overview

Review the previous day's activities and homework (first ten minutes of class).

Activity #24: Demonstration and discussion of APRs, SARs & SCBAs. If a demonstration is not available, proceed to Activity #25.

Activity #25: Trainee Review and Assessment. Groups create and answer questions as a review.

Homework Assignment: Review class notes.

DAY 11

Activity Guide #24

Personal Protective Equipment

Demonstration and discussion of APRs, SARs & SCBAs.
If a demonstration is not available, proceed to Activity #25

Performance Indicator

After completion of this activity, the trainees will have an understanding of some key acronyms and/or abbreviations used when discussing PPE.

Grouping: Whole group

Tasks: To take notes during the presentation by a HAZMAT team to gain an understanding of the meaning of the acronyms. Following the presentation, the trainees should submit their written reflections.

Instructional Materials and Supplies:

HAZMAT Team confirmation
Curriculum Guide
Paper, pencils, notebooks
Camera or Video equipment

Instructor's Notes

Confirm the Hazmat presentation prior to this session. This is a demonstration activity. Videotape this activity for future review. If a presentation cannot be scheduled, then skip this activity and proceed to Activity #25.

Assignment Sheet #11

Use with Activity #24

Personal Protective Equipment

List the limitations of a full-face APR:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

List the limitations of a full-face SAR:

1. _____
2. _____
3. _____
4. _____

List the limitations of SCBAs:

1. _____
2. _____

Assignment Sheet #12
Use with Activity #24
Personal Protective Equipment

List the PPE used in Level D:

Protective clothing: _____
_____
_____

Respirator: _____
_____
_____

Optional: _____
_____
_____

List the PPE used in Level C:

Protective clothing: _____
_____
_____

Respirator: _____
_____
_____

Optional: _____
_____
_____

Assignment Sheet #13
Use with Activity #24
Personal Protective Equipment

List the PPE used in Level B:

Protective clothing: _____
_____
_____

Respirator: _____
_____
_____

Optional: _____
_____
_____

List the PPE used in Level A:

Protective clothing: _____
_____
_____

Respirator: _____
_____
_____

Optional: _____
_____
_____

DAY 11

Activity Guide #25

Review and Assessment

Trainee Review and Assessment. Have each group of trainees prepare ten questions based on what they feel are the important things they should know at this point in the training. Then have the trainees answer the questions as a review.

Note: The instructor should schedule a demonstration of the PPE Monitoring device. Suggestions for presenters include: police, firefighters, utility company workers.

Performance Indicator

After completion of this activity, the trainees will have knowledge of the HAZMAT information to date.

Grouping:

Groups

Tasks:

Each group prepares ten questions covering the material they have covered up to this point in their training. Then the trainees answer each other's questions as part of the review.

Instructional Materials and Supplies:

Individual trainee notes
Curriculum Guide
Paper, pencils, notebooks

Instructor's Notes

Use the questions developed in this activity to construct a "Mid-term" exam for the trainees. Give the test toward the end of the class. Just pick about 5-10 questions.

Day 12

Site Safety and Health Plans

Instructional Overview

Review previous day's activities and homework (first ten minutes of class).

Reference: Manual - Section 7

Activity #26: Trainees create their own business site and develop a site safety plan that includes the minimum safety requirements.

Activity #27: Define the acronyms or abbreviations.

Activity #28: Research and writing on Emergency Response Plans

Homework Assignment: Prepare a summary outline from your notes today and bring in two newspaper articles related to some environmental issue.

DAY 12

Activity Guide #26

Site Safety and Health Plans

Each trainee creates her/his own business site and develops a site safety plan that includes the minimum safety requirements. They will see the relevance of the site safety plans to a variety of businesses and the need for trained consultants to insure compliance.

Performance Indicator

After completion of this activity, the trainees will have knowledge of site safety and health plans.

Grouping: Individual

Tasks: Each trainee will create her/his own business site and a site safety plan. The trainees identify the components of a safety plan and develop a plan which includes the basic components.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
OSHA regulations
HAZMAT references

Instructor's Notes

Each trainee will outline the components of a good site safety plan. They should develop their own plan that includes the minimum requirements according to OSHA. Assignment Sheets are included that refer to issues related to Site Safety and Health Plans. It is suggested that the Instructor expose trainees to this information for awareness purposes only.

Assignment Sheet #14

Use with Activity #26

Site Safety & Health Plans

CONFINED SPACE ENTRY PERMIT

Location: _____ **Date:** _____

Atmospheric Monitoring

Oxygen Level: _____ % **Time:** _____
Signature

Combustible Gas Level: _____ % **Time:** _____
(LEL) **Signature**

Specific Air Contaminants: _____ % **Time:** _____
(ppm) **Signature**

Chemical: _____

Required Personal Protection Equipment

Gloves:	_____	**Splash suit:**	_____	**Boots:**	_____
SCBA:	_____	**SAR:**	_____	**APR:**	_____
Wristlets:	_____	**Body Harness:**	_____	**Goggles:**	_____
Face Shield:	_____	**Glasses:**	_____		

Individual responsible for PPE selection: _____
Signature

Equipment at Confined Space Location

Winch: _____ **Extra Harness:** _____ **Tripod:** _____

Standby SCBA or Airline: _____

Audible Alarm or Radio: _____

Signatures:

Employee entering confined space: _____
Signature

Immediate Supervisor: _____
Signature

Safety and Health Officer: _____
Signature

Assignment Sheet #15

Use with Activity #26

Site Safety & Health Plans

- The location of the nearest:
  - Telephone or two-way radio.
  - Safety shower.
  - Fire extinguisher.

- A description of the location where the entry is taking place.

- Shut down procedures for welding/burning equipment. As long as anyone is inside the vessel, the watcher must remain in continuous contact with the worker. HE IS NOT TO LEAVE THE OBSERVATION POINT, EXCEPT TO REPORT AN EMERGENCY, after first sounding his alarm device.

- UNDER NO CIRCUMSTANCES SHOULD THE OBSERVER ENTER THE VESSEL. If the worker(s) in the vessel become ill or injured, he will sound the alarm and proceed to the nearest telephone or two-way radio. He should speak clearly and give the details about what has happened and where the emergency is. He is to be sure the message is repeated back correctly before leaving the phone or radio. The observer still DOES NOT ENTER THE VESSEL. He returns to the vessel and directs the rescue team.

Assignment Sheet #16

Use with Activity #26

Site Safety & Health Plans

CONFINED SPACE ENTRY PERMIT Continued

Before This Permit Can Be Signed The Following Rules Must Be Satisfactorily Completed.

	Initial All Items	
	Yes	**Not Necessary**
1. Tank cleaned, washed and purged:		
2. Wash water tested for neutrality:		
3. All fuses or safety jacks pulled, breakers and switches locked out & tagged:		
4. All lines broken and or blanked:		
5. Observer assigned and properly instructed:		
6. Employees in the immediate area alerted to help if needed:		
7. Rescue equipment on the job, extra rope, harness, breathing equipment & alarm:		
8. Ventilation provided:		
9. Electrical equipment bonded and grounded:		
10. Intrinsically safe equipment required:		

Safety equipment required: _____

_____

_____

_____

Atmospheric testing: _____

_____

_____

Initials	**Time**	**Exact Location**	**Flammable Vapors (%LEL)**	**Percent Oxygen (%O_2)**	**Toxics**

Additional Precautionary Remarks: _____

_____

_____

_____

Assignment Sheet #17
Use with Activity #26
Site Safety & Health Plans

STANDBY OBSERVER'S CHECK LIST

1.	Valid confined space entry permit.	[ ]
2.	Harness and life line used.	[ ]
3.	Instructed in the use of life line and harness.	[ ]
4.	Location of telephone or two-way radio.	[ ]
5.	Knows how to report emergency.	[ ]
6.	Knows location of job site and report.	[ ]
7.	Knows not to leave site when employee(s) are inside, except to make emergency call.	[ ]
8.	Knows NOT TO ENTER CONFINED SPACE.	[ ]
9.	Knows location of safety shower.	[ ]
10.	Knows location of fire extinguisher and how to use it.	[ ]
11.	Understands operation of blower or other air source.	[ ]
12.	Knows the operation of respirators (air line and SCBAs).	[ ]
13.	Has all necessary equipment including alarm horn.	[ ]
14.	Knows how to shut off welding/burning equipment.	[ ]
15.	Hazards of job and methods to safely perform work explained.	[ ]

Assignment Sheet #18

Use with Activity #26

Site Safety & Health Plans

COMPLIANCE AGREEMENT

Safety and Health Plan Compliance Agreement
_____ Mock Site -- Remedial Project

I, _____(print name), have received a copy of the Safety and Health Plan for the _____ Mock Site. I have read the plan, understand it, and agree to comply with all of its provisions. I understand that I could be prohibited from working on the project for violating any of the safety requirements specified in the plan.

Signed: _____ _____
Signature Date

Signed for:_____
Construction Company

_____ _____
Signature Date

Site Safety & Health Plans
Use with Activity #26

HAZARDOUS SUBSTANCE INFORMATION FORMS

COMMON NAME: Cutting Oil CHEMICAL NAME: Amino-cut

I. PHYSICAL/CHCEMICAL PROPERTIES SOURCE

Natural physical state: at temps. Of $20^0C - 25^0C$	Gas ves Liquid Solid		CHRIS. Dic
Molecular weight:	93	g/g-mole	CHRIS. Dic
Density:		g/ml	CHRIS. Dic
Specific gravity:	1.02 @ 90	$^0F/^0C$	CHRIS Dic
Solubility in water		$^0F/^0C$	CHRIS Dic
Solubility:		$^0F/^0C$	CHRIS Dic
Boiling point:	184	$^0F/^0C$	CHRIS Dic
Melting point:	-6	$^0F/^0C$	CHRIS Dic
Vapor pressure:	1.0mmHG @34	$^0F/^0C$	CHRIS Dic
Vapor density:	3.22@70	$^0F/^0C$	CHRIS Dic
Flash point: open closed	70	$^0F/^0C$	CHRIS Dic
Other:			

II. HAZARDOUS CHARACTERISTICS

TOXICOLOGICAL	HAZARD		CONCENTRATIONS	SOURCE
Inhalation:	Yes	No	PEL 2 ppm	OSHA
Ingestion:	Yes	No		ACGIH
Skin/eye absorption:	Yes	No	TWA 5 ppm	ACGIH
Skin/eye contact:	Yes	No		ACGIH
Carcinogenic:	Yes	No		
Teratogenic:	Yes	No		
Mutagenic:	Yes	No		
Aquatic:	Yes	No		
Other:	Yes	No	LC 50 1-50 mg	
Combustability:	Yes	No		
Toxic by-product)s):	Yes	No		
Flammability:	Yes	No		
LFL			1.3%	
UFL			11.0%	
Explosivity:	Yes	No		
LEL				
UEL				

Site Safety & Health Plans
Use with Activity #26

HAZARDOUS SUBSTANCE INFORMATION FORMS

REACT./CORROSIVE	HAZARD		CONCENTRATIONS	SOURCE
Reactivities:	Yes	No	_____	_____
water, bases, metals			_____	_____
Corrosivity:	Yes	No	_____ _____	_____
pH: _____	Yes	No	_____	_____
Neutralizing agent:	Yes	No	_____	_____
_____			_____	_____
_____			_____	_____

RADIOACTIVE	HAZARD		EXPOSURE RATE	SOURCE
Background:	Yes	No	_____	_____
Alpha particles:	Yes	No	_____	_____
Beta particles:	Yes	No	_____	_____
Gamma radiation:	Yes	No	_____	_____

III. DESCRIPTION OF INCIDENT

Quantity involved: _____
Release Information: _____
Monitoring/sampling: _____

IV. RECOMMENDED PROTECTION

Worker: Chemical resistant splash suit, supplied air respirator, gloves and boots. Level B protection.
Public: _____

V. RECOMMENDED SITE CONTROL

Hotline: _____
Decon line: _____
Command post: _____

VI. REFERENCES FOR SOURCES

ACGIH American Conference of Governmental Industrial Hygienists
CHRIS Chemical hazards response system manual II
CHEM DIC. Condensed chemical dictionary - Tenth ed. 1981
OSHA 29 CFR Part 1910.1017

Site Safety & Health Plans
Use with Activity #26

HAZARDOUS SUBSTANCE INFORMATION FORMS

COMMON NAME: Fecolic Acid_____ CHEMICAL NAME: Fecolic Acid

I. PHYSICAL/CHCEMICAL PROPERTIES

			SOURCE
Natural physical state: at temps. Of $20^0C - 25^0C$	Gas ves Liquid Solid		
Molecular weight:	34	g/g-mole	
Density:	102	g/ml	
Specific gravity:	1.3	$^0F/^0C$	
Solubility in water	100%	$^0F/^0C$	
Solubility:		$^0F/^0C$	
Boiling point:	258/126	$^0F/^0C$	CHRIS
Melting point:	-40	$^0F/^0C$	CHRIS
Vapor pressure:	8 mm Hg @25	$^0F/^0C$	CHRIS
Vapor density:	1.02	$^0F/^0C$	CHRIS
Flash point: open closed	will not burn	$^0F/^0C$	
Other:	Odorless. Colorless		

II. HAZARDOUS CHARACTERISTICS

TOXICOLOGICAL	HAZARD		CONCENTRATIONS	SOURCE
Inhalation:	Yes	No	LC 50 2000 ppm	OSHA
Ingestion:	Yes	No	LD 50 75 ppm	ACGIH
Skin/eye absorption:	Yes	No	LD 50 700 mg/kg	ACGIH
Skin/eye contact:	Yes	No		ACGIH
Carcinogenic:	Yes	No		
Teratogenic:	Yes	No		
Mutagenic:	Yes	No		
Aquatic:	Yes	No		
Other: 8 hour TWA	Yes	No	1.0 ppm	ACGIH
Combustability:	Yes	No		
Toxic by-product)s):	Yes	No		
Flammability:	Yes	No		
LFL				
UFL				
Explosivity:	Yes	No		
LEL				
UEL				

Site Safety & Health Plans
Use with Activity #26

HAZARDOUS SUBSTANCE INFORMATION FORMS

REACT./CORROSIVE	HAZARD		CONCENTRATIONS	SOURCE
Reactivities:	Yes	No	_____	_____
powerful oxidizer			_____	_____
Corrosivity:	Yes	No	_____	_____
pH: _____	Yes	No	_____	_____
Neutralizing agent:	Yes	No	_____	_____
_____			_____	_____
_____			_____	_____

RADIOACTIVE	HAZARD		EXPOSURE RATE	SOURCE
Background:	Yes	No	_____	_____
Alpha particles:	Yes	No	_____	_____
Beta particles:	Yes	No	_____	_____
Gamma radiation:	Yes	No	_____	_____

III. DESCRIPTION OF INCIDENT

Quantity involved: _____
Release Information: _____
Monitoring/sampling: _____

IV. RECOMMENDED PROTECTION

Worker: Chemical resistant splash suit, supplied air respirator, gloves and boots. Level B protection.
Public: _____

V. RECOMMENDED SITE CONTROL

Hotline: _____
Decon line: _____
Command post: _____

VI. REFERENCES FOR SOURCES

ACGIH American Conference of Governmental Industrial Hygienists
CHRIS Chemical hazards response system manual II
CHEM DIC. Condensed chemical dictionary - Tenth ed. 1981
OSHA 29 CFR Part 1910.1017

Site Safety & Health Plans

Use with Activity #26

HAZARDOUS SUBSTANCE INFORMATION FORMS

COMMON NAME: Fecolic Acid_____ CHEMICAL NAME: Fecolic Acid

I. PHYSICAL/CHCEMICAL PROPERTIES

			SOURCE
Natural physical state:	_____Gas	____ves Liquid ____Solid_____	
at temps. Of $20^0C - 25^0C$			
Molecular weight:	_____	g/g-mole	_____
Density:	_____	g/ml	_____
Specific gravity:	_____	$^0F/^0C$	_____
Solubility in water	_____	$^0F/^0C$	_____
Solubility:	_____	$^0F/^0C$	_____
Boiling point:	____193____	$^0F/^0C$	CHRIS____
Melting point:	____-35_____	$^0F/^0C$	CHRIS____
Vapor pressure:	0.3 mm Hg @25	$^0F/^0C$	CHRIS____
Vapor density:	____3.4 @ 25_	$^0F/^0C$	CHRIS____
Flash point: open closed	_____	$^0F/^0C$	_____
Other:	Odorless. Colorless_		_____

II. HAZARDOUS CHARACTERISTICS

TOXICOLOGICAL	HAZARD		CONCENTRATIONS	SOURCE
Inhalation:	Yes	No	1 hr. LC 50 347 ppm	OSHA____
Ingestion:	Yes	No	LD 50 2140 mg/kg__	ACGIH___
Skin/eye absorption:	Yes	No	Causes severe burns	ACGIH___
Skin/eye contact:	Yes	No	Causes severe burns	ACGIH___
Carcinogenic:	Yes	No	_____	_____
Teratogenic:	Yes	No	_____	_____
Mutagenic:	Yes	No	_____	_____
Aquatic:	Yes	No	_____	_____
Other:	Yes	No	_____	_____
Combustability:	Yes	No	_____	_____
Toxic by-product)s):	Yes	No	_____	_____
Sulfur dioxide (SO_2)			at high temps._____	CHRIS____
_____			_____	_____
Flammability:	Yes	No	_____	_____
LFL			_____	_____
UFL			_____	_____
Explosivity:	Yes	No	_____	_____
LEL			_____	_____
UEL			_____	_____

Site Safety & Health Plans
Use with Activity #26

HAZARDOUS SUBSTANCE INFORMATION FORMS

REACT./CORROSIVE	HAZARD		CONCENTRATIONS	SOURCE
Reactivities:	Yes	No	_____	_____
water, bases, metals			_____	__CHRIS____
Corrosivity:	Yes	No	_____all_____	__CHRIS____
pH:	Yes	No	_____	_____
Neutralizing agent:	Yes	No	_____	_____
_____			_____	_____
_____			_____	_____

RADIOACTIVE	HAZARD		EXPOSURE RATE	SOURCE
Background:	Yes	No	_____	_____
Alpha particles:	Yes	No	_____	_____
Beta particles:	Yes	No	_____	_____
Gamma radiation:	Yes	No	_____	_____

III. DESCRIPTION OF INCIDENT

Quantity involved: _____
Release Information: _____
Monitoring/sampling: _____

IV. RECOMMENDED PROTECTION

Worker: Chemical resistant splash suit, (ACID PROOF). OSHA permissible respiratory protection, splash goggles, gloves and boots.

Public: _____

V. RECOMMENDED SITE CONTROL

Hotline: _____
Decon line: _____
Command post: _____

VI. REFERENCES FOR SOURCES

ACGIH	American Conference of Governmental Industrial Hygienists
CHRIS	Chemical hazards response system manual II
CHEM DIC.	Condensed chemical dictionary - Tenth ed. 1981
OSHA	29 CFR Part 1910.1017

Assignment Sheet #19
Use with Activity #26
Site Safety & Health Plans

STANDARD MEDICAL CERTIFICATE

Company: _____

Applicant's Name: _____

Social Security #: _____

Date: _____

The above named applicant was examined by me and has been classified as noted below:

GRADE

A. _____ No significant defects, physically fit for job applied for.

B. _____ Minor defects not expected to interfere with job performance.

C. _____ Substantial defects that warrant temporary rejection pending further evaluation or treatment of a condition that should be cleared prior to employment.

D. _____ Severe defects, major findings that can be expected to interfere with safe job performance and that cannot be corrected. (Applicants in this category cannot be employed without review and approval of the Corporate Medical Director.)

COMMENTS: _____
_____
_____
_____

Physician's Name: _____

Address: _____
_____
_____

Physician's Signature: _____

Date: _____

Assignment Sheet #20

Use with Activity #26

Site Safety & Health Plans

1. List the ten (10) minimum requirements for a safety plan:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

2. List four (4) examples of unusual hazards that would make additional special training necessary:

1. _____

2. _____

3. _____

4. _____

3. Write out the following abbreviations or acronyms:

CRC _____
CRZ _____
PDS _____
S&HO _____

Assignment Sheet #21
Use with Activity #26
Site Safety & Health Plans

4. List the two (2) basic types of emergencies on a hazardous waste site and give four (4) examples of each:

1. _____ a. _____

b. _____

c. _____

d. _____

2. _____ a. _____

b. _____

c. _____

d. _____

5. List five (5) important elements of an emergency response plan:

1. _____

2. _____

3. _____

4. _____

5. _____

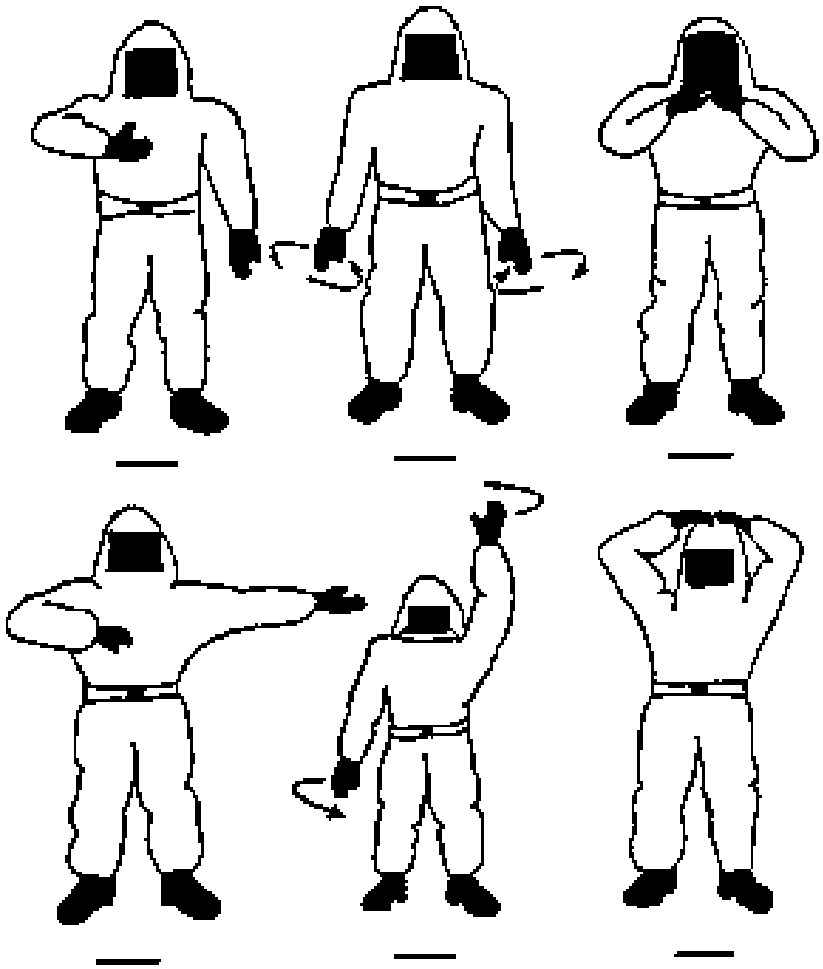
Assignment Sheet #22

Use with Activity #26

Site Safety & Health Plans

Match the international hand and arm signals with one of the following responses.

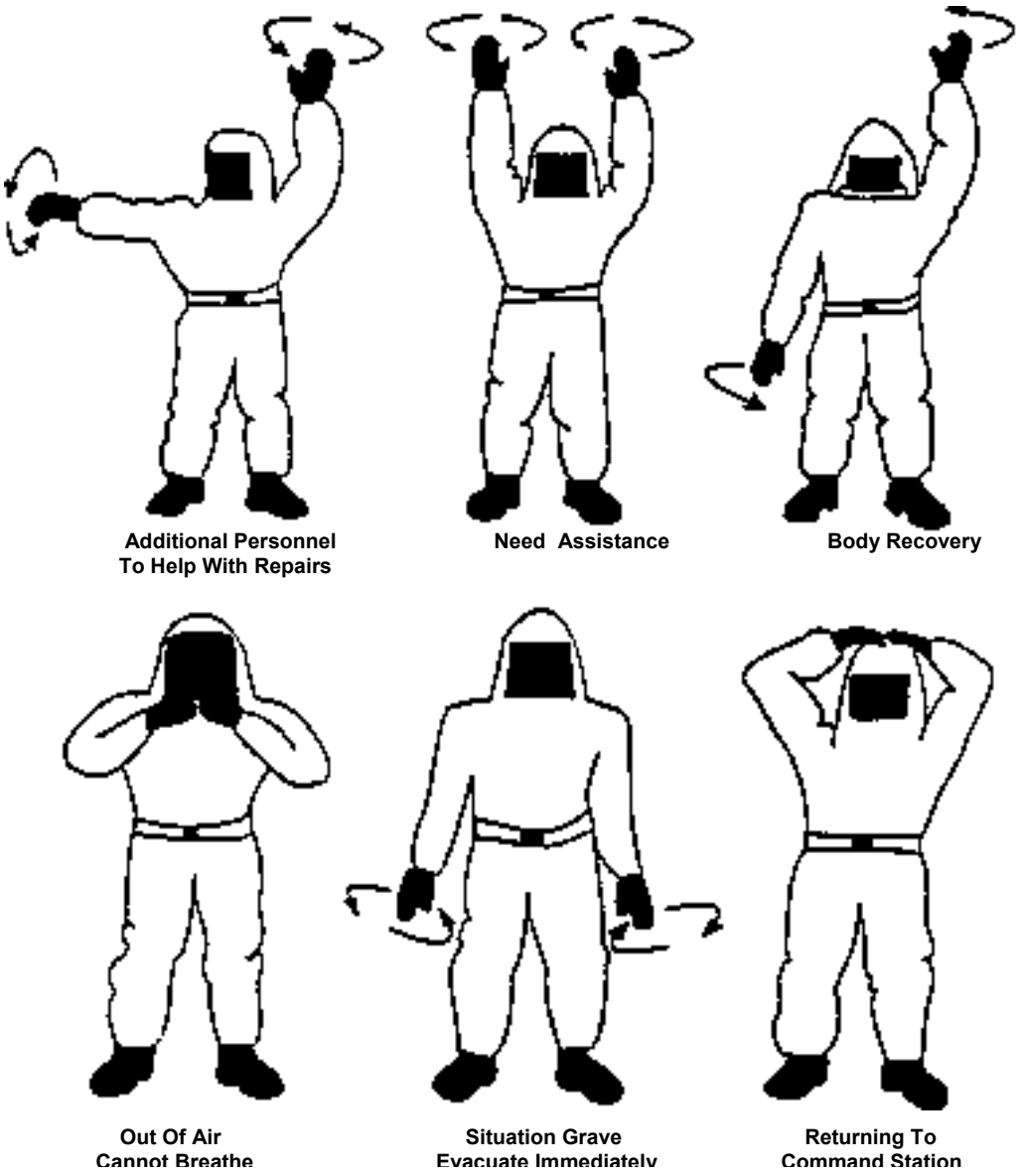
A. **Additional Personnel to Help With Repairs**
B. **Need Assistance**
C. **Body Recovery**
D. **Out of Air, Cannot Breathe**
E. **Situation Grave, Evacuate Immediately**
F. **Returning To Command Station**
G. **OK, I'm All Tight**
H. **Leave Area Immediately**
I. **No, Negative**
J. **Activities Cannot Be Completed**
K. **Situation Under Control**



Site Safety and Health Plans

Use with Activity #26

INTERNATIONAL HAND AND ARM SIGNALS



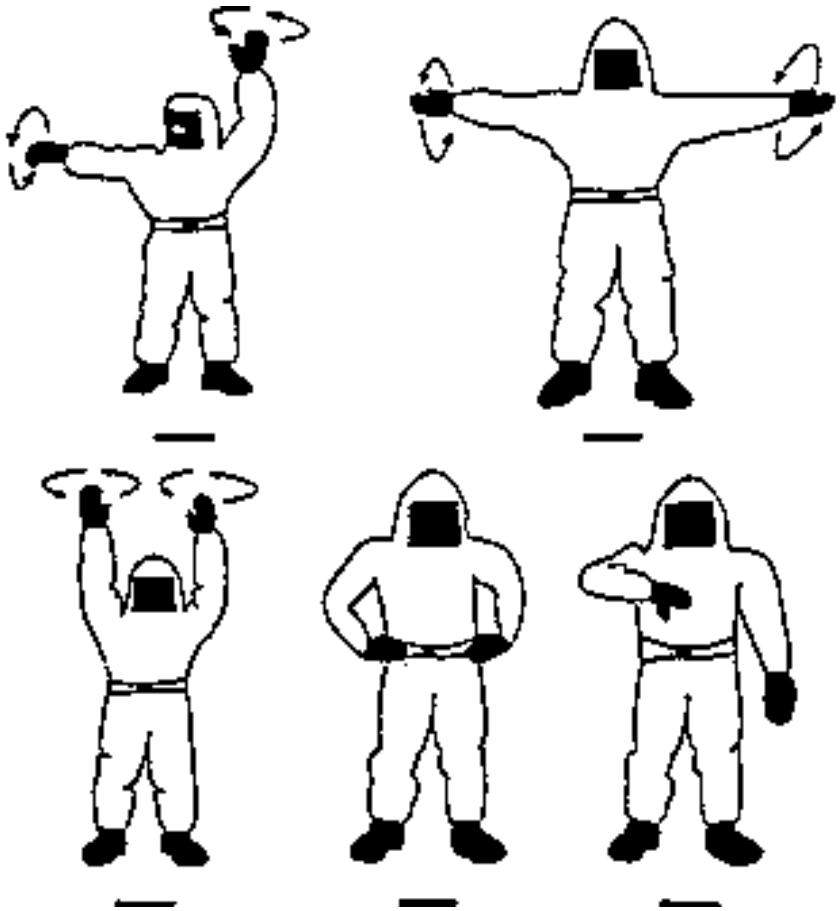
Assignment Sheet #23

Use with Activity #26

Site Safety & Health Plans

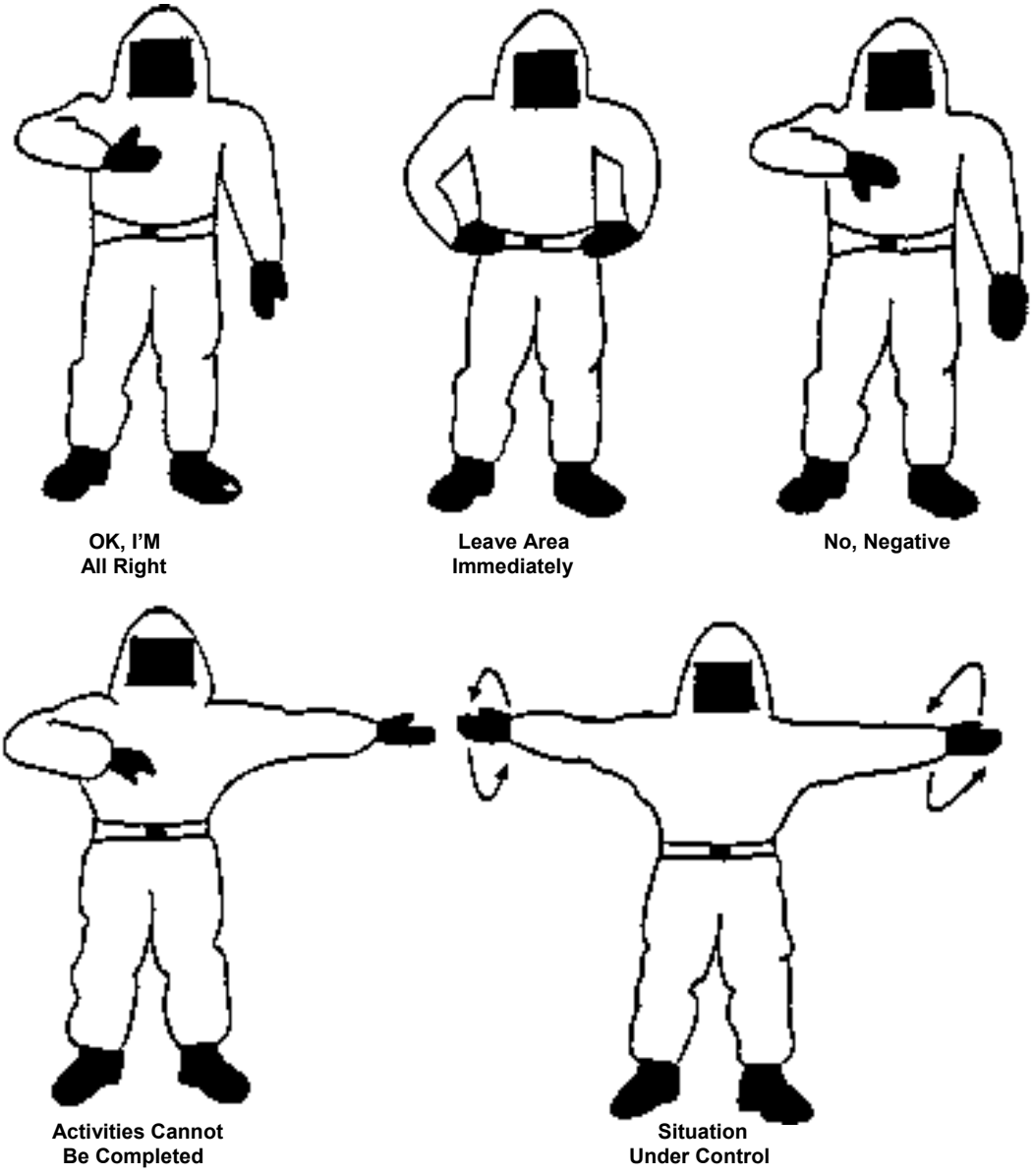
Match the international hand and arm signals with one of the following responses.

L. **Additional Personnel to Help With Repairs**
M. **Need Assistance**
N. **Body Recovery**
O. **Out of Air, Cannot Breathe**
P. **Situation Grave, Evacuate Immediately**
Q. **Returning To Command Station**
R. **OK, I'm All Tight**
S. **Leave Area Immediately**
T. **No, Negative**
U. **Activities Cannot Be Completed**
V. **Situation Under Control**



Site Safety and Health Plans
Use with Activity #26

INTERNATIONAL HAND AND ARM SIGNALS



OK, I'M
All Right

Leave Area
Immediately

No, Negative

Activities Cannot
Be Completed

Situation
Under Control

DAY 12

Activity Guide #27

Site Safety and Health Plans

Define the following acronyms or abbreviations:
CRZ, CRC, PDS, S&HO.

Performance Indicator

After completion of this activity, trainees will have an understanding of the site safety and health plans.

Grouping: Individual

Tasks:

Improve ability to remember information, by using mnemonic associations. Each association is self-generated by the trainees and they share their creations with the other groups.

Instructional Materials and Supplies:

Individual Trainee notes
Curriculum Guide
Paper, pencils, notebooks

Instructor's Notes

*See the "Study Skills" curriculum. Mnemonics are just memory aids, usually word or picture associations that trigger the memory of a fact, concept, name etc. Example: Some musicians use "**A**ll **C**ows **E**at **G**rass", to remember the letter names for the base clef spaces.*

DAY 12

Activity Guide #28

Site Safety and Health Plans

Review material learned to date related to site safety. What is an Emergency Response Plan? Why is it important? How is it developed? What are the two basic types of emergencies that could happen on a hazardous waste site? Has either occurred in neighboring states?

Scenario: The communities are very alarmed. Trainees are being interviewed by the local news media to explain the two types of emergencies. They must initiate an emergency response plan, being careful to include all the important elements.

Performance Indicator

After completion of this activity, trainees will have a deeper understanding of the site safety and health plans.

Grouping: Individual research; group performance

Tasks: Research two types of emergencies that could exist on a hazardous waste site and determine what should be included in a plan to respond to these emergencies.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Environmental Science resource books, if available
OSHA regulations
Hazardous waste training manual, if available, or other resources

Instructor's Notes

Alert the trainees to this activity at least one day in advance. Do not give a lot of specifics.

DAY 12
Activity Guide #29
Site Safety Plans

Acronyms and Key Terms:

ICS- Incident Command System
OSC-On Scene Commander
CRC-Contamination Reduction Corridor
CRZ-Contamination Reduction Zone
EMS-Emergency Medical Services
SAR
SCUBA
Size Up
Security
Boundaries
Exclusion Zone
Support Personnel
Decontamination
Buddy System

Performance Indicator

After completion of this activity, trainees will be familiar with terms, definitions and application of site safety plans at HAZMAT Sites and influencing factors.

Grouping: Individual research; group performance

Tasks:

- Draw hypothetical HAZMAT site
- Indicate various zones and entrance criteria
- Have students draw hypothetical site and locate various zones to include support area.
- Discuss various factors that might cause situation to deteriorate or otherwise be modified, such as time, weather, day of week, time of year, etc.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Environmental Science resource books, if available
OSHA regulations
Hazardous waste training manual, if available, or other resources

Instructor's Notes

It would be helpful at this point to refer to known local HAZMAT sites.

Day 13

Material Handling, Storage, & Transportation

Instructional Overview

Reference: Manual, Section 8

Review previous day's activities and homework (first ten minutes of class).

Activity #30: Video Presentation
"Asbestos Handling and Lead Handling"

DAY 13

Activity Guide #30

Material Handling, Storage, & Transportation

Show Video Presentation
"Asbestos Handling and Lead Handling"

Performance Indicator

After completion of this activity, the trainees will have a better understanding of cautions required for handling, storing and transporting hazardous materials.

Grouping:

Whole group

Tasks:

Trainees will view a video, which gives an overview of the handling, moving and storing of asbestos and lead.

Instructional Materials and Supplies:

Curriculum Guide
Paper, pencils, notebooks
Environmental Science resource books, if available
OSHA regulations
Hazardous waste training manual, if available, or other resources
Videos that give an overview of the handling of asbestos and lead.

Instructor's Notes

Try to secure these videos, in advance, from a university or a company involved with the handling of hazardous materials. Encourage the trainees to simply watch the video first, then watch it a second time to take notes.

Day 14

Field Trip No. 3

Suggested destination: a chemical company. This visit will provide an introduction to chemical hazards, equipment, and safety.

Day 15

Review and Assessment

Oral Presentations and Discussions: Each group will prepare and present a summary of training thus far and the remaining groups will take notes. Try to involve each group member in the presentation. Videotaping would enhance this activity.

Day 16

PPE Monitoring

Instructional Overview

Apparatus Demonstrations, US Coast Guard, and Modeling (when appropriate)

Review previous day's activities and homework (first ten minutes of class).

Activity #30: A guest speaker should be provided to give hands-on opportunities with PPE monitoring devices.

DAY 16

Activity Guide #31

PPE Monitoring

Invite a guest speaker (from the Coast Guard) to give the trainees hands-on opportunities with PPE monitoring devices.

The presentation should provide the answers to the following:

1. List the two general groups of air monitoring instruments.
2. Give four examples of chemicals or substances that the direct reading instruments can detect.
3. Give three limitations of direct reading instruments.

Performance Indicator

After completion of this activity, the trainees will have an understanding of the importance of PPE monitoring.

Grouping: Whole Group

Tasks: The trainees should be provided with opportunities to view apparatus demonstrations and modeling and seek answers to the "guide questions."

Instructional Materials and Supplies:

Recorders (optional)
Paper, pencils, notebooks
Environmental Science resource books, if available
Hazardous waste training manual, if available, or other resources

Instructor's Notes

The Coast Guard is a possible resource for these demonstrations. However, contact should be made as early as possible. Also, give the Coast Guard speaker the questions early so the trainees can get the answers during the demonstration.

Day 17

The Superfund Program & Community Relations

Instructional Overview

Review previous day's activities and homework (first ten minutes of class).

Invite a guest speaker to make a presentation to the trainees:

Suggestion: an environmental attorney or environmental activist.

Activity #32: Define important environmental terms and acronyms from today's presentation.

DAY 17

Activity Guide #32

The Superfund Program & Community Relations

Define the following terms from today's presentation:

Preliminary Assessment (PA)
Hazard Ranking System (HRS)
Remedial Investigation (RI)
Remedial Design (RD)
Operations and Maintenance (O&M)
Site Inspection (SI)
Removal Actions
Feasibility Study (FS)
Remedial Action (RA)
Record of Decision (ROD)

Performance Indicator

After completion of this activity, the trainees will have knowledge of the Superfund program vs. Community relations and of Superfund related terms.

Grouping: Whole Group

Tasks: Trainees interact by matching terms with definitions.

Instructional Materials and Supplies:

Index cards or sentence strips
Paper, pencils, notebooks, markers
Environmental Science resource books, if available
Hazardous waste training manual, if available, or other resources

Instructor's Notes

The class will interact as a group. Trainees with terms find their matching partner carrying the definitions. After pairing off, each matching pair reads off the term and corresponding definition to the class.

Day 18

The Superfund Program & Community Relations

Instructional Overview

Review previous day's activities and homework (first ten minutes of class).

Cumulative Review: 15 - 20 minutes

Activity #33: Two teams in class match terms related to HAZMAT safety and environment.

Video presentation and discussion.

Homework Assignment: prepare 10 possible test questions and answer them.

DAY 18

Activity Guide #33

The Superfund Program & Community Relations

Select two teams of trainees. Give one group a set of terms and the other a set of definitions of each term. Each team matches terms and acronyms related to safety and the environment.

Performance Indicator

After completion of this activity, the trainees will have increased knowledge of the Superfund program, community relations and knowledge of terms related to Superfund.

Grouping:

Whole Group

Tasks:

Trainees interact by matching terms with definitions. Group one will locate the member in group two with the card which matches his or her card.

Instructional Materials and Supplies:

Paper, pencils, notebooks, markers
Environmental Science resource books, if available
Hazardous waste training manual, if available, or other resources
Index cards or sentence strip.

Instructor's Notes

The class should interact as a group. Trainees with terms find their matching partner carrying the definitions. After pairing off, each matching pair reads off the term and corresponding definition to the class.

Day 19

Field Trip No. 4

Suggestions: Visit a “Brownfield.”

Visit a Superfund designated site.

Day 20

Review and Assessment

1. Portfolio preparation.

2. Review and assessment:
   (use homework questions from Day 17
   for general review).

Day 21

Hazardous Waste, Respiratory Protection, & Hazard Communication Standards – Test Methods

Instructional Overview

Cumulative Review: First 15 - 20 minutes, on all material to date.

Reference: OSHA 1910.120, 1910.134, and 1926.59

Activity #34: Group 1 prepares and presents a summary of OSHA regulations. Other groups work on portfolios, while Group 1 is working.

Homework Assignment: Cumulative Review

DAY 21

Activity Guide #34

Hazardous Waste, Respiratory Protection, & Hazard Communication Standards Test Methods

Group 1 prepares and presents a summary of OSHA regulations on "Test Methods." This group will prepare questions to test the understanding of the other trainees during and after their presentation. Other groups work on Portfolios, while Group 1 is preparing.

Performance Indicator

After completion of this activity, trainees will have knowledge of hazardous waste, respiratory protection, and hazardous communication standards test method.

Grouping:

Group 1

Tasks:

Trainees in Group 1 present, as a unit, a summary of OSHA regulations as they relate to test methods.

Instructional Materials and Supplies:

Paper, pencils, notebooks, markers
Environmental Science resource books, if available
Hazardous waste training manual, if available, or other resources
OSHA regulations (volume access)

Instructor's Notes

The instructor will monitor the contributions of each group member. Consider the time allocated. Presentations should be summative. This group will also prepare questions to test the understanding of the other trainees during and after their presentation. Other groups work on Portfolios, while Group 1 is preparing.

Day 22

Hazardous Waste, Respiratory Protection, & Hazard Communication Standards — Compliance

Instructional Overview

Cumulative Review: First 15 - 20 minutes, on all material to date.

Reference: OSHA 1910.120, 1910.134, and 1926.59

Activity #34: Group 2 prepares and presents a summary of OSHA regulations for "Compliance." Other groups work on portfolios, while Group 2 is preparing.

Homework Assignment: Cumulative Review

DAY 22

Activity Guide #35

Hazardous Waste, Respiratory Protection, & Hazard Communication Standards - Compliance

Group 2 prepares and presents a summary on OSHA regulations for "Compliance." This group will also prepare questions to test the understanding of the other trainees during and after their presentation. Other groups work on portfolios, while group 2 is preparing.

Performance Indicator

After completion of this activity, the trainees will have better knowledge of hazardous waste, respiratory protection, and hazardous communication standards compliance.

Grouping: Group 2

Tasks: Trainees in Group 2 present, as a unit, a summary of OSHA regulations as they relate to compliance.

Instructional Materials and Supplies:

Paper, pencils, notebooks, markers
Environmental Science resource books, if available
Hazardous waste training manual, if available, or other resources
OSHA regulations (volume access)

Instructor's Notes

The instructor should monitor the contributions of each group member for parity. Consider the time allocated. Presentations should be summative.

Day 23

Hazardous Waste, Respiratory Protection, & Hazard Communication Standards - Levels of Protection

Instructional Overview

Cumulative Review: First 15 - 20 minutes, on all material to date.

Reference: OSHA 1910.120, 1910.134, and 1926.59

Activity #36: Group 3 prepares and presents a summary on OSHA regulations on "Levels of Protection." Other groups work on portfolios, while group 3 is preparing.

Homework Assignment: Cumulative Review

DAY 23

Activity Guide #36

Hazardous Waste, Respiratory Protection, & Hazard Communication Standards – Levels of Protection

Group 3 prepares and presents a summary on OSHA regulations on "Levels of Protection." This group will also prepare questions to test the understanding of the other trainees during and after their presentation. Other groups work on portfolios, while group 3 is preparing.

Performance Indicator

After completion of this activity, the trainees will have a better knowledge of hazardous waste, respiratory protection, and hazardous communication standards levels of protection.

Grouping:

Group 3

Tasks:

Trainees in Group 3 present, as a unit, a summary of OSHA regulations as they relate to compliance.

Instructional Materials and Supplies:

Paper, pencils, notebooks, markers
Environmental Science resource books, if available
Hazardous waste training manual, if available, or other resources
OSHA regulations (volume access)

Instructor's Notes

Time is a factor with this activity. Monitor the contributions of each group member. Presentations should be summative. Remember that Groups 1-3 have all been assigned presentations. This is the last group to present.

Day 24

Field Trip No. 6

Suggestion: A guest speaker such as an environmental attorney.

A Presentation on compliance and the need for minority workers.

Day 25

Review and Assessment

Instructional Overview

1. Review and assessment
2. Give Post - Test

Day 26

Final Portfolio Check

Use portfolios to evaluate progress of trainees and program. Review portfolios for professionalism, neatness, and creativity.

Criteria: student selected samples and examples of their best work, including minimum evidences that the student needs to demonstrate achievement and interest of targeted audience. This includes the student's statement of reason(s) for each selection.

Day 27

End of Program

Presentation of awards and certificates.

HAZMAT GLOSSARY

Instructor Note These terms are considered to be fundamental to the study of hazardous materials. Instructors should feel free to assign additional terms on an as needed basis.

Accident An unexpected event generally resulting in injury, loss of property, or disruption of service.

Action Level A quantitative limit of a chemical, biological, or radiological agent at which actions are taken to prevent or reduce exposure or contact. Usually set at one half of the Permissible Exposure Limit.

Acute Severe, often dangerous, conditions in which relatively rapid changes occur in a short period of time.

Acute Exposure An intense exposure over a relatively short period of time.

Aquifer A saturated water bearing formation of permeable rock, sand or gavel.

Asphyxiant A chemical (gas or vapor) that can cause death or unconsciousness by suffocation. Simple asphyxiants, such as nitrogen, either use up or displace oxygen in the air. They become especially dangerous in confined or enclosed spaces. Chemical asphyxiants, such as carbon monoxide and hydrogen sulfide, interfere with body's ability to absorb or transport oxygen to the tissues.

Boiling Point The temperature at which the vapor pressure of a liquid equals atmospheric pressure or a liquid changes to a vapor. The boiling point is usually expressed in degrees Fahrenheit. If a flammable material has a low boiling point it indicates a special fire hazard.

Breakthrough The penetration of challenge material(s) through a gas or vapor air purifying element.

"C" or ceiling A description usually seen in connection with a published exposure limit. It refers to the concentration that should not be exceeded, even for an instant. It may be written as TLV-C or Threshold Limit Value-Ceiling (also see THRESHOLD LIMIT VALUE).

Carcinogen A substance or physical agent that may cause in humans or animals.

C.A.S. Number Identifies a particular chemical by the Chemical Abstracts Service, a service of the American Chemical Society that indexes and compiles abstracts of world wide chemical literature called "Chemical Abstract."

Chemical As broadly applied to the chemical industry, an element or a compound produced by chemical reactions on a large scale for either direct industrial or consumer use or for reaction with other chemicals.

Chemical Reaction A change in the arrangement of atoms or molecules to yield substances of different composition and properties.

Chronic Persistent, prolonged or repeated conditions or an illness such as black lung disease which occurs over a long period of days, weeks or years.

Chronic Exposure A prolonged exposure occurring over a period of days, week or years.

Combustible According to the DOT and NFPA, combustible liquids are those having a flash point at or above 100^{o}F (37.8^{o}C). or liquids that will burn. They do not ignite as easily as flammable liquids. However, combustible liquids can be ignited under certain

circumstances, and must be handled with caution. Substances, such as wood, paper, etc. are termed “Ordinary Combustible.”

Concentration The relative amount of a material in combination with another material. (For example, 5 parts of acetone per million parts of air.)

Contaminant/Contamination An unwanted and non-beneficial substance.

Corrosive A substance that according to the DOT, causes visible destruction or permanent changes in human skin tissue at the site of contact or is highly corrosive to steel.

Cutaneous Pertaining to or affecting the skin.

Decomposition The breakdown of a chemical or substance into different parts or simpler compounds. Decomposition can occur due to hear, chemical reaction, decay, etc.

Decontamination The process of removing contaminants from individuals and equipment.

Degree of Hazard A relative measure of how much harm a substance can do.

Dermal Pertaining to or affecting the skin.

Dermatitis An inflammation, disease or illness of the skin.

Direct-Reading A device that measures and displays in a short period, the concentration of a contaminant in the environment.

Dose An amount of a substance given or exposed to over time.

Dyspnea Shortness of breath, difficult or labored breathing.

Emergency A sudden and unexpected event calling for immediate remedial action.

Environmental Assessment The measurement of prediction of the transport, dispersion, and final location of a released hazardous substance.

Environmental Hazard Incidents involving the release (or potential release) of Hazardous materials into the environment, which require immediate remedial action.

Environmental Samples Samples that are considered to contain no contaminants or low concentrations of contaminants.

EPA Number The number assigned to chemicals regulated by the Environmental Protection Agency (EPA).

Epidemiology The study of disease inhuman populations.

Episode Incident.

Evaporation Rate The rate at which a material is converted to vapor (evaporates) at a given temperature and pressure when compared to the evaporation rate of a given substance.

First Responder The first trained personnel to arrive on the scene of a hazardous material incident. Usually officials from local emergency services, fire fighters, and police.

Flammable Liquid According to the DOT and NFPA a flammable liquid is one that has a flash point below 100^{o}F (see Flash Point).

Groundwater Water in a saturated zone of formation beneath the surface of land or water.

Hazard A circumstance or condition that can do harm. Hazards are categorized into four groups: Biological, chemical, radiation and physical.

Hazard Evaluation The impact or risk the hazardous substance poses to public health and the environment.

Hazard Classes A series of nine descriptive terms have been established by the UN Committee of Experts to categorize the hazardous nature of chemical, physical, and biological materials. These categories are: Flammable liquids, explosives, flammable solids, poisonous and infectious substances, and dangerous substances.

Hazardous Capable of posing an unreasonable risk to health and safety (DOT). Capable of doing harm.

Hazardous Material Any substance or compound that has the capability of producing adverse effects on the health and safety of humans.

Hazardous Samples Samples that are considered to contain high concentrations of contaminants.

Hazardous Substance 1) A material and it's mixtures or solutions that are defined by the letter "E" in Column (1) of the Hazardous Materials Table, CRR 49, Section 172,1 when offered for transportation in one package, or in one transport vehicle if not packaged, and when the quantity of the material therein equals or exceeds the reportable quantity. 2) Any substance designated pursuant to Section 311(b)(2), (a) of the Federal Water Pollution Control Act, (b) any element, compound, mixture, solution, or substance designated pursuant to Section 102 of this Act, (c) any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the Solid Waste Hazardous Disposal Act (but not including any waster under the Solid Waste Disposal Act which has been suspended by Act of Congress), (d) any toxic pollutant listed under Section 307 (a) of the Federal Water Pollution Control Act, (e) any hazardous air pollutant listed under Section 112 of the Clean Air Act, (f) any imminently

hazardous chemical substance or mixture with respect to which the Administrator has taken action pursuant to Section 7 of the Toxic Substance Control Act.

The term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under subparagraphs (a) through (f) or this definition, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such as synthetic gas).

Hazardous Waste Any material that is subject to the hazardous waste manifest requirement of the Environmental Protection Agency specified in the CFR, Title 40, Part 262 or would be subject to these requirements in the absence of an interim authorization to a State under Title 40, CFR, Part 123, Subpart F.

Ignitable A solid, liquid or compressed gas waste that has a flash point of less than 140^{o}F. Ignitable material may be regulated by the EPA as a hazardous waste, as well.

Immediate Removal Actions undertaken to prevent or mitigate immediate and significant risk or harm to human life, health or to the environment. As set forth in the National Contingency Plan, these actions shall be terminated after $1 million has been obliged, or six months have elapsed from the date of initial response.

Incident The release or potential release of a hazardous substance into the environment.

Incident Characterization The process of identifying the substance(s) involved in an incident, determining exposure pathways and projecting the effect it will have on people, property, wildlife and plants, and the disruption of service.

Incident Evaluation The process of assessing the impact released or potentially released substances pose to public health and the environment.

Incompatible The term applied to two substances to indicate that one material cannot be mixed with the other without the possibility of a dangerous reaction.

Information Knowledge acquired concerning the conditions or circumstances particular to an incident.

Ingestion Taking a substance into the body through the mouth as food, drink, medicine, or unknowingly as on

Inhalation The breathing in of an airborne substance that may be in the form of gases, fumes, mists, vapors, dusts, or aerosols.

Inhibitor A substance that is added to another to prevent or slow down an unwanted reaction or change.

Inspection A careful and critical examination.

Intelligence Information obtained from existing records or documentation, placards. Labels, signs, special configuration or containers, visual observations, technical records, eye witnesses, and others.

Investigation A formal, systematic examination or study.

Irritant A substance that produces an irritating effect when it contacts skin, eyes, noses, or respiratory system.

Lethal Concentration The concentration of an air contaminant that will kill all of the test animals in a group within the first 30 days following exposure.

Lethal Dose$_{50}$ (LD$_{50}$) The dose of a substance or chemical that will kill 50 percent (50%) of the test animals in a group within the first 30 days following exposure.

Limited Quantity With the exception of Poison E materials, the minimum amount of a hazardous material for which there is a specific labeling and packaging.
Mitigation Actions to prevent or reduce the severity of harm.

Monitoring The process of measuring certain environmental characteristics on a real time basis for space and time variations. For example, air monitoring may be conducted with direct-reading instruments to indicate relative changes in air contaminant concentrations at various times.

National Contingency Plan Policies and procedures that the Federal Government follows on implementing responses to hazardous substances.

Odor Threshold The minimum concentration of a substance at which a majority of test subjects can detect the substance's characteristic odor.

On-site Presence within the boundaries of the work site.

Off-site Presence outside the work-site.

Oral Having to do with the mouth.

Oxidation The process of combining oxygen with some other substance or a chemical change in which an atom loses electrons.

Oxidizer Is a substance that gives up oxygen easily to stimulate combustion or organic material.

Oxygen Deficiency An atmosphere having less than the normal percentage of oxygen found in normal air. Normal air contains 21% oxygen at sea level.

Pathways of Dispersion The mode (water, groundwater, soil, and air) by which a Chemical moves through the environment.

Permissible Exposure Limit (PEL) An exposure limit that is published and enforced by OSHA as a legal standard. PEL may be either a time-weighted average (TWA) exposure limit (8 hour), a 15-minute short term exposure limit (STEL),or a ceiling © The PELs are found in Tables Z-1, Z-2, and Z-3 of OSHA regulations 1910.1000 (see also TLV).

Persistent Chemicals A substance which resists biodegradation and/or chemical oxidation when released into the environment and tends to accumulate on land, in air, in water, or in organic matter.

Personal Protective Equipment Any devices or clothing worn by the worker to protect against hazards in the environment. Examples are respirators, gloves, and chemical splash goggles.

Planned Removal The removal of released hazardous substances from the environment within a non-immediate, long term, time period. Under CERCLA: Actions intended to minimize increases in exposure such that time and cost commitments are limited to 6 months and/or 1 million dollars.

Pollutant A substance or mixture which after release into the environment and upon exposure to any organism will or may reasonably be anticipated to cause adverse effects in such organisms or their offspring.

Pollutant Transport An array of mechanisms by which a substance may migrate outside the immediate location of the release or discharge of the substance. For example, pollution of groundwater by the migration of hazardous wastes from a landfill.

Polymerization A chemical reaction in which two or more small molecules combine to form larger molecules that contain repeating structural units of the original molecules. A hazardous polymerization is the above reaction with an uncontrolled release of electrons.

Qualified Individual A person who through education, experience, or professional accreditation is competent to make judgements concerning a particular subject matter. A Certified Industrial Hygienist may be a qualified individual for preparing a site safety plan.

Reactivity A substance's susceptibility to undergoing a chemical reaction or change that may result in dangerous side effects, such as explosion, burning, and corrosive or toxic emissions. The conditions that cause the reaction, such as heat, other changes and dropping will usually be specified as "Conditions to Avoid" when a chemical's reactivity is discussed on a MSDS.

Regulated Material A substance or material that is subject to regulations set forth by the Environmental Protection Agency, the Department of Transportation, or any other federal agency.

Remedial Actions As in the National Contingency Plan, response to releases on the National Priority List (NPL) that are consistent with permanent remedy to percent or mitigate the migration of a release of hazardous substances into the environment.

Reportable As set forth in the Clean Water Act, the quantity or minimum amount (pounds or kilograms) of a substance that may be discharged in a 24 hour period that requires notification of the appropriate government agency.

Respirator A device that is designed to protect the wearer from inhaling harmful contaminants.

Respiratory A particular concentration of an airborne contaminant that enters the body by way of the respiratory system or by being breathed into the lungs and results in some body function.

Response Activities Activities taken to recognize, evaluate, and control an incident.

Risk The probability that an unwanted event (harm) will happen.

Risk Assessment The use of factual base to define the health effects of exposure of individuals or populations to hazardous materials and situations.

Risk Management The process of weighing alternatives and selecting the most appropriate action using the results of risk assessment, engineering data, and social and economic concerns to reach a decision.

Routes of Exposure The manner in which a chemical contaminant enters the body. (For example: oral, inhalation, cutaneous, and parenteral routes of entry.)

Safety Freedom from man, equipment, material, or environmental actions that result in injury or illness.

Sampling The collection of a representative portion of the universe. For example, the collection of a water sample from a contaminated stream.

Second Responders Those personnel required to assist or relieve first responders at a hazardous material incident due to their specialized knowledge, equipment, or experience. These can include State environmental protection or health officials, commercial response and clean-up companies, and appropriate industry representatives.

Sensitizer A substance that may cause no reaction in a person during initial exposure but afterwards, a further exposure will cause an allergic response to the substance.

Severe A relative term used to describe the degree to which hazardous material releases can cause adverse effects to human health and the environment.

Short Term Exposure Limit Represented as STEL or TLV-STEL, this is the maximum concentration to which workers can be exposed for a short period of time (usually 15 minutes) for only four times throughout the day with at least one hour between exposures. Also the daily TLV-TWA must not be exceeded.

Site Location.

Site Safety Plan Written site-specific safety rules that establish requirements for protecting the health and safety of responders during all activities conducted at an incident or site.

Skin This designation sometimes appears along side a TLV or PEL. It refers tot he possibility of absorption of the particular chemical through the skin and eyes. Thus, protection of large surface areas of skin should be considered to prevent skin absorption so that the TLV is not exceeded or counteracted.

Substance Any chemical entity.

Synonym Another name by which the same chemical may be known.

Systemic Spread throughout the body; affecting many or all body systems or organs, not localized in one spot or area.

Teratogen An agent or substance that may cause physical defects in the developing embryo or fetus when a pregnant female is exposed to that substance.

Third Responders Those personnel required to help the first or second responders handle special situations or to conduct the cleanup, removal, and associated activities.

These can include federal environmental protection and health officials, other federal agencies, commercial response and clean up companies, and appropriate industry representatives.

Threshold Limit Value (TLV) Airborne concentrations of substances devised by the ACGIH that represents conditions under which it is believed that nearly all workers may be exposed day after day with no adverse effect, TLVs are advisory exposure guidelines, not legal standards, that are based on evidence from industrial experience, animal studies, or human studies when they exist. There are three different types of TLVs. They are: Time Weighted Average (TLV-TWA), Short Term Exposure Limit (TLV STEL), and Ceiling (TLV-C), (see also PEL).

Time Weighted Average The average time, over a given work period (e.g., 8-hour workday), of a person's exposure (TWA) to a chemical or agent. The average is determined by sampling for the contaminant throughout the time period. Represented as TLV-TWA.

Toxicity The potential of a substance to exert a harmful effect on humans or animals and a description of the effect and the conditions or concentration under which the effect takes place.

Trade Name The commercial name or trademark by which a chemical is known. One chemical may have a variety of trade names depending on the manufacturers or distributors involved.

Unstable Liquid A liquid that, in its pure state or as commercially produced, will react vigorously in some hazardous way under shock conditions (i.e. dropping), certain temperatures, or pressures.

Upper Explosive Limit Also known as Upper Flammable Limit, is the highest Concentration (expressed in percent of vapor or gas in the air by volume) of a substance

that will burn or explode when an ignition source is present. Theoretically, above this limit, the mixture is said to be too "RICH" to support combustion. The difference between the LEL and UEL constitutes the flammable range or explosive range of a substance. That is, if the LEL is 1 ppm and UEL is 5 ppm, then the explosive range of the chemical is from 1 to 5 ppm (See also LEL).

Vapor The gaseous form of substances which are normally in liquid or solid state (at room temperature and pressure). Vapors evaporate into the air from liquids such as solvents. Solvents with low boiling points will evaporate readily.

Work Plan Written directives that specifically describe all work activities that are to take place at a work site.